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DIGITAL ART

CREATIVE HANDBOOK

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THE COMPLETE DIGITAL ART CREATIVE HANDBOOK

Get creative!

"I paint my own reality. The only thing I know is that I paint because I need to, and I paint whatever passes through my head without any other consideration." Frida Kahlo

Are you driven to create digital art each and every moment of the day? Driven to take inspiration from both the real and fantasy worlds, and to create bigger and more ambitious projects? Then look no further than this, the latest edition in the Creative Handbook series. In this packed issue we take a look at the tools, techniques and capabilities of *Photoshop*, *Illustrator*, *Painter* and *Poser*.

In our first chapter we concentrate on Adobe's powerful drawing package, *Illustrator*, and to start off we've got some of the best professional illustators around to share their secrets. The rest of the chapter continues in the same vein, with features and tutorials designed to help you get the most from the software, and improve your drawing skills.

Next we turn our attention to Adobe *Photoshop*, and show you how you can harness its power to create artwork in a wide variety of styles, from anime and fantasy art to graffiti. We've included plenty of in-depth tutorials to give you inspiration and help you improve your technique.

Then we take a look inside the worlds of *Painter*, and *Poser*. Here we take a closer look at the magic of fantasy art, and the impact that it has had on movies and television. Once again we've included several in-depth tutorials that take you through everything from creating fantasy figures to dramatic manga painting to divine satin gowns.

Our final chapter examines the 3D universe and, while our tutorials will enable you to create a range of stunning efffects we also look at other aspects of this field, including the careers that are available.

The authors you'll encounter on the following pages are all masters in their respective fields. Apart from contributing regularly to top creative monthly magazines such as *Computer Arts*, *3D World* and *ImagineFX*, they all are well respected names in the business. So just pop the CD into your machine, turn the page and open your mind to a new world of exciting possibilities.

Enhance and develop your skills across Photoshop, Illustrator, Painter and Poser and reap stunning rewards!

Tamsin

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CHAPTER 1

Inside Illustrator

We start this chapter with five pages of invaluable advice on making a living as an illustrator from some of the key players in the business. We then introduce you to some of the best plug-ins that you can use to create great illustration effects with *Illustrator* and *Freehand*, and consult the experts again for some top tool tips. Then we get down to the drawing, showing you how to create custom graffiti fonts, add depth to vector art and animate an illustration. We finish by showing you how to create a cool flatpack toy that can be cut out and assembled.

10 50 insider tips for illustrators

17 Illustrators' resources

22 40 top tool techniques

28 Create your own graffiti fonts

34 Adding depth to your characters

40 Character animation

46 Animate your vector artwork

52 Design and build a flatpack toy

CHAPTER 2

Fabulous Photoshop

We begin this chapter with a look at three creative fields in which *Photoshop* is a key application: fantasy artwork, game design and graffiti. Then we get to work in *Photoshop* itself, with a masterclass on adding realistic textures to 3D imagery, and a tutorial on drawing simple but striking character faces. Next we change styles completely, showing you how to draw and then colour a beautiful anime-style fantasy figure. We finish off by returning to the theme of graffiti, with tutorials on creating artwork in a distinctive urban style, and designing a custom tag brush.

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Painter and Poser

We kick off this chapter with a real treat for aspiring comic illustrators, as acclaimed artist Steve Miller shows you how to create fantasy characters. There's a fascinating feature on concept art for movies, and you'll find out how to create a concept art fantasy world step by step. We've got a whole host of great *Painter*-based tutorials (although you can just as easily follow them in *Photoshop*), ranging from gothic-style art to Manga, and we'll also show you how to create a 3D fantasy figure using *Poser* and *Z-Brush*, and add it to a backdrop produced in *Photoshop*.

110 30 fantasy tips

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CHAPTER 4

The 3D universe

This chapter isn't just for artists who like to play around with 3D – it's for anyone who's serious about making a living in the fields of 3D rendering and animation. To that end we've got a feature on careers in 3D, and two more in which leading figures in the business talk about integrated production pipelines for movies and tie-in games, and about the prospects for creating truly realistic 3D humans. On the practical side we've got a whole host of fun tutorials – whether you want to have your movie characters pursued by boulders, create realistic lighting effects or batter the living daylights of a virtual stuntman, this chapter's for you!

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Disc pages

You're unlikely to own all of the software featured in this book, and on your CD you'll find links to manufacturers' websites where you'll find more information on the applications and be able to download trial versions so you can get started trying them out. On the following pages you'll find bonus tutorials that will help you to get more out of Adobe's *Photoshop* and *Illustrator*, and ACD Systems' *Canvas*.

215 Hybrid illustration with Canvas

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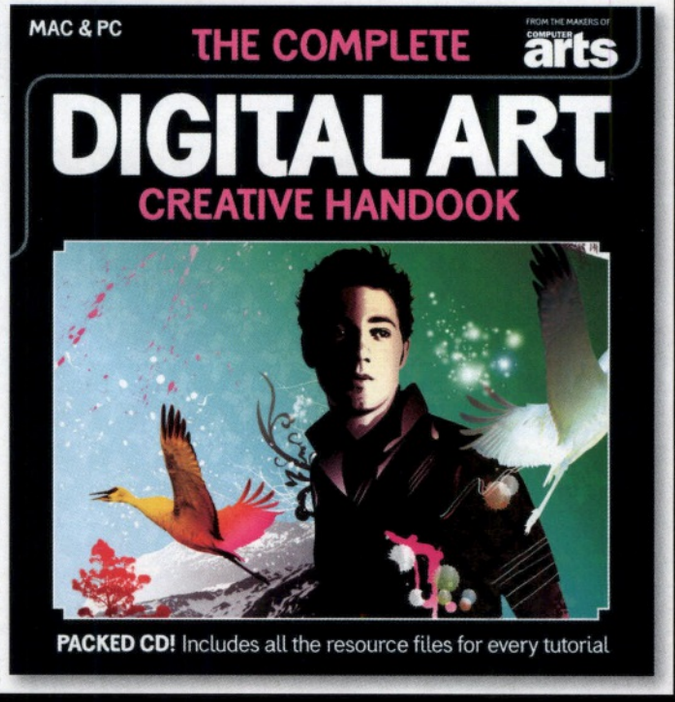
ON YOUR PACKED CD

Learn as you go!

Included on this CD are all the resource files that you need in order to complete the tutorials.

You'll also find links to the various software manufacturers so you can download any trial versions you might want.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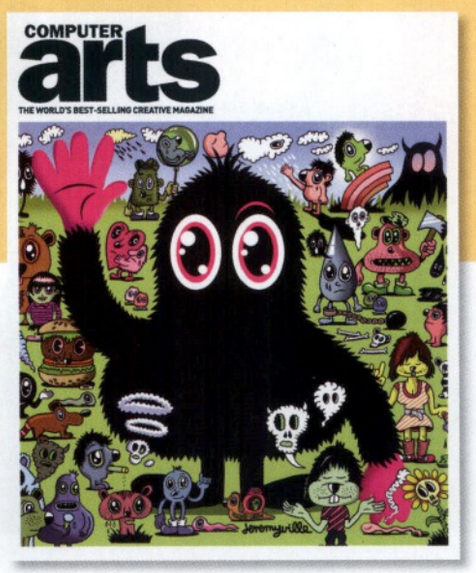

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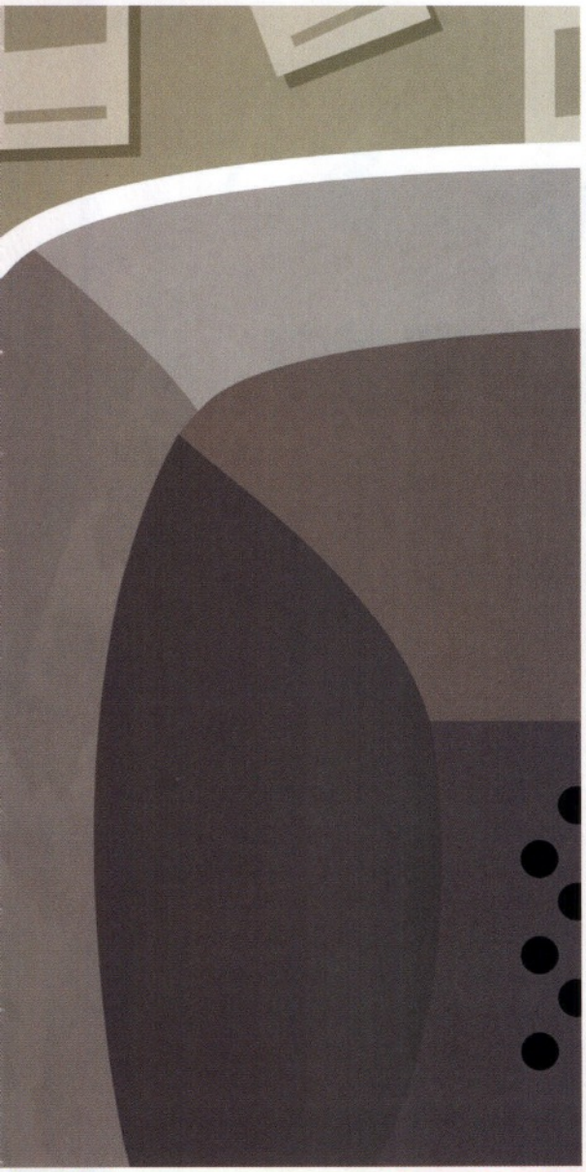

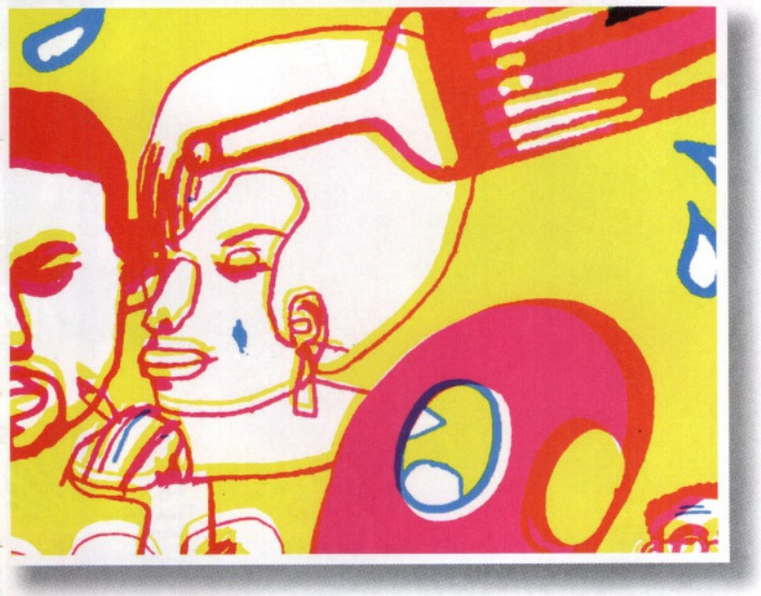

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Feature

50 insider tips for illustrators

Work smarter, not harder, and keep your head above water with these tips and insights from some of the top names in the creative world…

Some of the most innovative and prolific illustrators in the business have taken time out to share their top 50 tips for getting started – and for becoming successful. These guys are pros, and their advice will help you to approach your own work in a more professional way. Get the low-down on starting your own studio and promoting your work. Find out how to get that portfolio up to scratch, win clients and price jobs, get tips on finding inspiration, and discover the benefits of collaboration. You'll even find out how to organise your time to fit it all in...

Compiled by Lawrence Zeegen, an illustrator, educator, writer and agent. Lawrence is the author of *Digital Illustration* and *The Fundamentals of Illustration*.
[w] www.zeegen.com, www.zeegenrush.com

Left: McFaul's image for *New Scientist* magazine was created using his own process of "draw, paint, cut, scribble, splash, scan, photograph, coffee, phone calls, email, draw, paint, manipulate, stare out of window..."
[w] www.mcfaul.net

Part 1

Getting started in illustration

1 An education in illustration

Many illustrators swear by the education they received as full-time art school students, while many others maintain that learning 'on the job' is the best route. Steve Wilson, graduate of the University of Brighton Illustration BA course, says: "I made loads of mistakes when starting out. There's a lot that can't be taught, you have to do it in practice..."

2 Putting education into practice

Picking your own way through the minefield that is contemporary illustration practice isn't easy. McFaul, himself a graduate of Kingston University's illustration undergraduate course says: "Although the education I received was second to none, I'm still under the impression that those of us that left education at that time were dropped off in the middle of nowhere blindfolded!' Watch out for the pitfalls.

3 The highs and the lows

Life as an illustrator can be rewarding one day and frustrating the next. Although it's demanding being your own boss, it's also an attractive lifestyle. JAKe, illustrator, cartoonist and animator, explains: "I haven't had a 'real' job for ten years – I'd find the structure too hard. One of the highs of life as an illustrator is that there's nobody telling me what time to get out of bed!" Create a daily structure that works for you.

4 Working from home

Setting up a studio to work out of is a crucial first step. If resources are low, your first studio may well be where you live. Jody Barton, illustrator with Big Active, having left his urban London lifestyle for a rural one, describes his space: "Two wobbly desks, two computers and a telephone – situated in the middle of nowhere. From my window I can see a truck on the way to the slaughterhouse."

5 Your first studio

You'll know when the time has come to set up your own studio away from where you live, because you'll have problems: a partner demanding the spare bedroom back for visiting guests or the kitchen table heaving under the weight of a Mac, monitor, scanner, printer and other kit. You can't set up your own studio until finances allow, but make sure you do it before it starts to affect everyone that you live with...

6 Turning a hobby into a job

Why work in illustration when it can appear such a haphazard career choice? Jon Burgerman, illustrator and king of doodles, says: "It can feel isolating, but it turns your hobby into a job." McFaul, however, goes a little harder on his advice for aspiring illustrators: "Think lifestyle, not job." Get involved in illustration because you love doing it, not because it appears a smart career move. Jody Barton states: "Make work that is your own, not what you think will get you a big fizzy drinks ad campaign!"

7 Ask for advice

Seek advice from those who have already set up a studio, ask questions of internet service providers and telephone companies, and view a number of rental spaces before you make a final decision. "My working environment," explains Michael Gillette, based in San Francisco, "is a small cramped room, although I am moving to a new larger studio. I've always worked in chaotic places, but it doesn't seem to affect my work."

8 Technology – keep learning

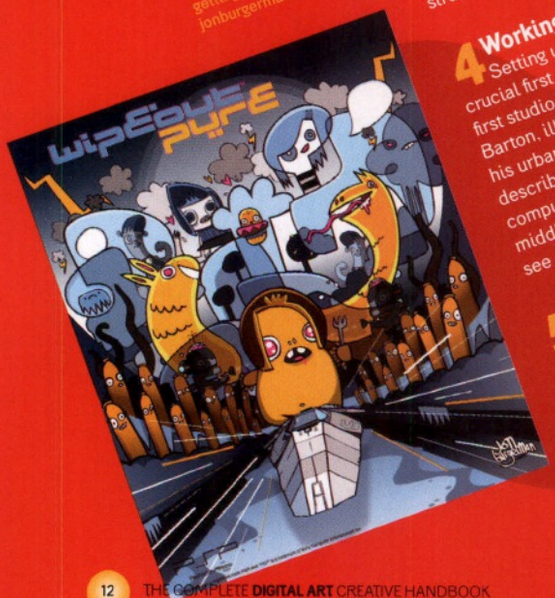
Understanding software and hardware issues is a necessity. Become friends with a technical whizz-kid or learn how to keep your kit performing in tip-top condition yourself. The pros outweigh the cons of the digital era, as far as Michael Gillette is concerned. "The flexibility of illustration in the digital age is a huge bonus," he states. "It allowed me to move from the UK to the US, after all."

9 The taxman and the accountant

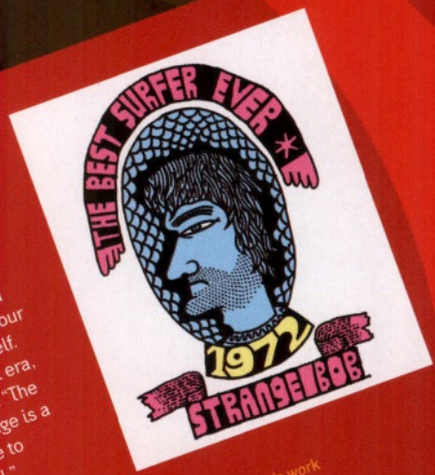
Enlist the services of a good accountant, one that understands the creative industries. Ian Wright, the London-based innovator, admits that his accountant has "bailed me out many times – he could be the key to my survival!" JAKe also advocates being organised, although he admits to being a little lax: "For me it's receipts in a shoe box until I *really* have to look at it!"

10 The software police

Don't get prosecuted. Be street legal and avoid the temptation of using anything other than legit software. Update regularly, although in most cases you can skip every other version to save funds, and keep abreast of new software developments by reading magazine reviews and trying 30-day demos.

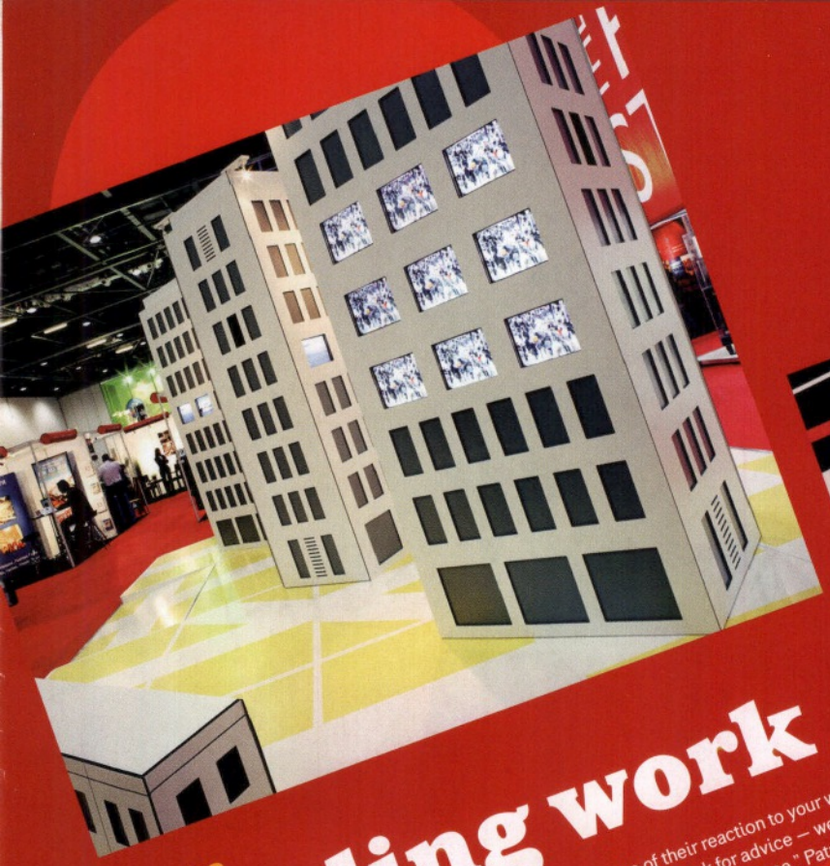


Below: Jon Burgerman's recent press ad for *WipEout Pure* on the PSP. Jon's advice is straightforward: "The best self promotion is doing great work and getting it seen." [w] www.jonburgerman.com



Top: Steve Wilson's work for The Living Things, a band signed to Sony BMG, for its album *Ahead of the Lions*. Wilson recalls, "I made loads of mistakes when starting out – there's a lot that can't be taught, you have to do it in practice..." [w] www.wilson2000.com

Above: Jody Barton's Strange Bob T-Shirt design for Mambo, Spring 2005. Barton works from "two wobbly desks" in his studio, which looks out on rural countryside, with "trucks on their way to the slaughterhouse." [w] www.jodybarton.co.uk



Far left: Anthony Burrill's recent installation project for the Barbican Centre in London. He worked with Mark Garside, PAM and Scarlet Projects. "WORK HARD AND BE NICE TO PEOPLE," is Anthony's philosophy. [w] www.anthonyburrill.com

Left: Richard May's CD jacket image for 'new-art punksters' Punish The Atom's album *I Cry Demolition*. Richard advocates simplicity when it comes to a promotional website: "Better 20 large images than 60 tiny ones – keep it simple and to the point," he states. [w] www.richard-may.com

Part 2

Finding work

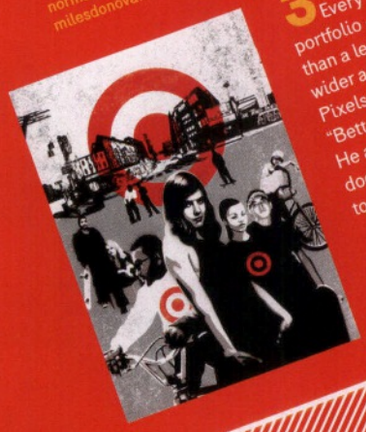
1 Issues, ideas and strategies

Decide what self-promotion methods work for you but, whatever you choose, avoid annoying the people you're marketing to. Some illustrators advocate simple procedures. Patrick Thomas of Studio laVista, based in Barcelona, suggests: "Do every job as well as you possibly can – that's the best way to promote yourself." Jon Burgerman agrees: "The best self-promotion is doing great work and getting it seen."

2 Portfolio do's and don'ts

Your portfolio is a valuable tool, so prepare it well, keep it organised and look after it. Anthony Burrill, designer/illustrator, offers useful advice: "Keep it simple, with a good mixture of self-initiated and actual commissions. Make it look professional – good quality print-outs on decent paper." Steve Wilson suggests: "Put your hand in your pocket and invest in leather – your book, after all, will be going to big ad agencies competing against other illustrators' portfolios for the same job."

Below: Peepshow's Miles Donovan created this image to target stores in an August 2005 issue of the *New Yorker*. "Agents," explains Donovan, "find work you wouldn't normally get." [w] www.milesdonovan.co.uk



3 Online portfolios

Every illustrator needs a web-based portfolio – it's perhaps even more useful than a leather-bound one for reaching a wider audience. Richard May, co-founder of Pixelsurgeon and Black Convoy, reckons, "Better 20 large images than 60 tiny ones." He adds, "Make sure that the presentation does your work justice – keep it simple and to the point."

4 Attitude and commitment

Ian Wright advises hitting the streets and seeing lots of potential clients with your work: "Take notice of their reaction to your work, don't be afraid to ask for advice – we were all new to the profession once." Patrick Thomas offers clear-cut thinking: "Be prepared to work bloody hard if you're going to get anywhere." And Anthony Burrill quotes from one of his own letterpress self-promotional posters: "WORK HARD AND BE NICE TO PEOPLE!"

5 Keeping contacts

Get a good database application, or get used to using a digital address book and spend time keeping it up to date, because it'll take up huge chunks of time later if you don't. Miles Donovan of Peepshow explains his own procedures: "All my contacts are on my Mac and iPod and are regularly updated and backed up – all important!" Peepshow's work-experience folk "phone around asking for names and emails of art directors, which is handy", admits Miles.

6 Winning clients and business

There is no magic formula for getting the job, nor a wand to wave to ensure success. It can be down to luck, but more often it's down to graft and persistence. Ensuring that your work is visible, and is being seen by the right people at the right companies – those in a position to commission – will help. Original work that is both brilliantly executed and communicates clearly will find admirers.

7 How to pitch

There are occasions when a phone call from an art director puts you in an interesting position. He/she explains that the agency is doing a pitch for a client, and if it comes off there will be stacks of work for you, all very well paid, naturally. However, they need you to work frantically non-stop for 48 hours to win the pitch and can barely offer you £200. Think carefully about what to do.

8 Agents – pros and cons

There are so many factors for and against getting an agent, but the bottom line is that a great agent can get you work that you wouldn't have time to chase or even know about. "My agents in New York," explains McFaul, "are worth their weight in gold, but I'm also very proactive myself." Miles Donovan agrees: "They find work you wouldn't normally get, command higher fees and offer support if things go wrong."

9 Be aware of industry developments

Being aware of what's happening in the design world is crucial, and keeping abreast of recent projects by other illustrators through news and reviews in magazines will help too. Checking sites such as Design Observer and Pixelsurgeon on a regular basis will ensure that you're constantly up to date. These activities shouldn't be a chore – they're valuable research.

10 Successful meetings

Arrive early at a business meeting and make sure you've done your homework: know who you're seeing and familiarise yourself with the client's recent work. Large design and advertising agencies make this easy for you by having their press releases bound and in their reception areas. Be organised, take a notebook and pen to the meeting and ask questions if you're unsure. Be well groomed too – appearance does count.

Part 3

Managing your projects

Left: Patrick Thomas created 'The world unites to aid Africa' for *La Vanguadia* newspaper in January 2005. Thomas explains his principles for undertaking free work: "I don't regard making a piece of work against war, for example, as a 'job' – I consider it a moral obligation." [w] www.lavistadesign.com

1 What makes a great idea?

Being able to recognise a strong idea takes time and experience, although being aware of when your creative thinking is not up to scratch is a good start. A great idea will communicate your message without the need to talk it through. Remember, you won't be there to explain your illustration to everyone who views it! Richard May's straight-talking advice about how to recognise a strong concept is: "You just know!"

2 How and when to get ideas

There's no sure-fire, tried-and-tested method that will guarantee you'll always get a great idea, but that uncertainty and buzz you'll get from the pressure of having to come up with one is quite some drive. JAKe, from his studio in East London, reflects: "On a good day, it feels like they come out of nowhere – just grab a sketchbook and pencil and start loosening up and see what happens..."

Below: JAKe created this T-shirt design for 2KbyGingham (available Spring 2006) from initial sketchbook doodlings and ideas. 'Ringo' is the Japanese word for 'Apple'. "On a good day, it feels like ideas just come from nowhere," offers JAKe. [w] www.jake-art.com

3 From beer mat to mood board

Illustrators' visuals/roughs vary as much as styles and ways of working. There is no rule-of-thumb to help here; experience will determine how much work you'll need to undertake to get your idea across. Some art directors demand a high level of finish, while others are happy to have a chat on the phone or via email and then let you go straight to artwork. You'll soon get a feel for which method suits you best.

4 The importance of originality

To survive in illustration you need to offer a unique take on the world around you; it's your own visual language that will get the respect – and the work – from commissioning art directors. "There are far too many illustrators and designers churned out of colleges," says Patrick Thomas. "You are competing in a very strange environment, against a huge number of talented and determined people," adds Jody Barton. "Make your own work!"

5 Making life a little easier

Having a game plan, understanding where you are right now and where you would like to be in 12 months' time can help dramatically. Plan carefully, structuring your week and your month in detail. Decide when you're going to make appointments to see potential clients, and when you're going to spend time updating your website. Michael Gillette recalls advice given to him by another illustrator: "What have you done today to show the world that you exist?"

6 Getting the price right

When putting a price on your work it's important not to panic. You can always take some time out to think about it. If you're offered a fee over the phone, ask for five minutes to have a think about it, and say that you'll call back. Use your five minutes wisely: weigh the offer against your previous experience, and check against previous commissions to ensure that the fee seems fair. You can even make a phone call to another illustrator if you need a second opinion. If asked to name a price, you can always put the boot on the other foot and ask what the budget is – every job has a budget!

7 When to work for free

Nothing upsets illustrators more than discussion about free work. JAKe says: "You wouldn't ask a plumber to fix a leaky tap for free... 'It'll look good in your portfolio, mate!'" Michael Gillette agrees: "Only do free work for charities – it devalues the whole industry if you do it for clients, so don't do it." Patrick Thomas, guided by his principles, states: "A job that has no production budget is simply not worth doing. I don't regard making a piece of work against war, for example, as a 'job' – I consider it a moral obligation."

8 How to command the best fees

Advice about commanding top dollar for your work varies from illustrator to illustrator. Jody Barton advises that it's wise to keep in mind exactly what you do: "You are a professional, mostly with a qualification, and sooner or later you'll have bills to pay. Never ever charge less than £100 per day and, of course, much of the work you undertake will demand somewhat higher fees."

9 Sticking to deadlines

Late nights working against the clock, working throughout the week and then straight through the weekend into the following week – illustration is rarely a nine-to-five existence, because some projects demand high levels of input to meet the deadline. Your professionalism is not only judged by your output, but also by your ability to deliver on time. "To miss a deadline for press is inconceivable," stresses Patrick Thomas.

10 Delivering the goods

Whether it's being available on the end of a phone or answering emails within a reasonable length of time, communicating regularly with your clients all helps ensure that you come across as a professional. If you want to work for a client a second time, make sure that their experience of working with you is a positive one. This isn't rocket science, just common sense.

Right: NEW's ad work for Carhartt mixes and matches a number of techniques and working methods. As for doing collaborative projects, "sometimes it's all peaches and cream, sometime it's chalk and cheese – but it's all good." [w] www.new-online.co.uk

Part 4

Creative thinking

1 Research and development

Illustration isn't an exact science: each illustrator has his or her own approaches to making images. However it works for you, it pays dividends to occasionally reflect upon your own working methods and processes. McFaul describes his creative process as follows: "Draw, paint, cut, scribble, splash, scan, photograph, coffee, phone calls, email, draw, paint, manipulate, stare out of window, laugh, fiddle, scan, manipulate, go out, come back, scan."

2 Looking and learning

All work and no play makes an illustrator a dull boy or girl. Creative meanderings or visual wanderings off the beaten track can add untold pleasures to an illustrator's archives and collections. Inspiration can come from anywhere: a colour combination spotted and photographed for later perusal, a torn discarded scrap of paper with part of a photographic image, but with a unique visual language. You should always be on the look-out for inspiration.

3 A life outside illustration

It isn't healthy spending all of your time submerged in the discipline. It takes dedication and long working hours, but you need to emerge once in a while and live the rest of your life. Michael Gillette keeps his head out of illustration for references and inspiration: "I like old 19th Century stuff at the moment – it's better to be inspired by an esoteric reference than a contemporary one."

4 Iconic inspiration

For most people, there are key illustrations that define moments in their lives. It might be an album or CD sleeve: The Beatles *Revolver* or Radiohead's *OK Computer*, for example, or a Martin Sharpe psychedelic poster or book jackets for Penguin classics. Whatever they are, these are important images that mark moments in our lifetime. As illustrators, we dream of creating iconic works – enjoy the dream!

5 Addictive illustration

Never satisfied, illustrators are constantly on the prowl for the next fix. Getting a job is a great high, and doing the job is another head rush; but, like a junkie constantly demanding another fix, illustrators constantly strive to get their work into new fields. Ambitious illustrators yearn for an array of canvasses – Austin at NEW (also a Black Convoy member) wants it all: "More collaborations, more live illustration, painting, exhibitions, publishing and chaos!"

6 Collaborative projects

Working with other creatives opens up new possibilities and connections. "Sometimes it's all peaches and cream, sometime it's chalk and cheese – but it's all good..." explains Austin. McFaul, a Co-founder of Black Convoy, has his own take: "It's an educational experience that can open up many avenues – you can benefit from the opinions of others." Neasden Control Centre agrees: "It's healthy and keeps you fresh."

7 Risk as a learning process

Stepping into the unknown, creatively, can give you a boost. Ensuring that the repetitive process of commission, creation, delivery and invoice is injected with moments of madness is important in remaining open to new ideas. Jon Burgerman explains a recent project: "I'm working with a Danish artist, Sune Ehlers, on *Hello Duudle* books. I've never actually met or even spoken to Sune, but the process of bouncing JPEGs over email yields new ideas..."

8 Playing around with new ideas

As well as working with others, it's important to retain aspects of the 'art school' experience in your working methods. Take time out of commissions to make new things, and use this time to really explore new ways of working. Bring new processes to your working pattern: if you normally draw from photographs, draw only from life; if you always create colours purely in *Photoshop*, scan lush colours hand-painted on watercolour paper. Keep experimenting.

9 Managing your time

Everything you do takes longer than you think. Watching the time, and wondering when you can 'clock off' is not an option for an illustrator – you're more likely to spend time wishing the clock wasn't rushing ahead so quickly. With deadlines to meet and clients phoning, not to mention emailing and everyday workflow issues, it really is sensible to map out your working day, and even working week, to stay ahead of the game.

10 Get into a routine

Have a structure to your day. Organise your time well, answer emails and open post at the start of every day, then get down to being creative. Anthony Burrill, illustrator/designer, explains why a structure helps his creative flow: "During the day I make and receive countless calls and emails. I am addicted to email, but sometimes have to turn it off to get rid of the distraction." It pays to recognise good working practice.

Above: Michael Gillette, based in San Francisco, created this image for *Pimp My Car*, MTV's car makeover show. "It's better to be inspired by an esoteric reference than a contemporary one," he explains. [w] www.michaelgillette.com

Part 5

Career development

1 Don't sell your soul

It's important that you enjoy what you do. Anthony Burrill, when asked about the lows of working in illustration, replies: "I can't think of any." Others are more reflective: McFaul doesn't enjoy "the solitude" and Richard May warns that "cash-flow can be a huge problem if you're not careful", but Neasden also thinks "there are no lows." Only 'do' illustration if you feel a passion for the activity...

2 Job satisfaction

"Saying no and turning down work, and the money, can make you feel great — in charge," says Ian Wright. But why would you say no when it can take forever to even be asked to undertake a commission? Michael Gillette explains why he says no: "When I get a sinking feeling when reading the brief, and realise that doing the job will make me feel like a lesser artist," although he adds honestly, "this is sometimes negated by the need for cash".

3 Giving something back

Away from the screen, the phone and the solitude, many illustrators enjoy a regular teaching slot working with students. "Teaching reminds me why I wanted to be an illustrator in the first place," admits Ian Wright. Austin at NEW states: "I think it's healthy. I like discussing ideas and meeting people who are excited at the prospect of doing something new, describing their world." Jon Burgerman gives lectures: "They make me take stock of what I've actually done," he says.

4 Getting a job in education

Interested in getting involved in some teaching? Start by getting a CV and samples of work together, and send them to courses at foundation and undergraduate level. Explain in a covering letter why you'd like to get involved, offer to give a professional practice lecture to students about your own experiences. You could start by contacting the very course you studied on — after all, you're a success story aren't you?

5 Building your profile

Some illustrators crave recognition by their peers. For many it isn't enough to see their work in print regularly, and they look to other methods and means of spreading their gospel. Speaking at conferences and live events, posting comments on discussion boards, writing to magazines and sending in press releases containing new work are all ways of getting your work in front of more people, but don't overdo it — too much and you can turn people off.

6 Maintaining your profile

Keeping clients aware of your latest work is a fundamental aspect of good marketing. A regular email newsletter with information about recent projects will keep people informed. Again, however, too much and it'll have the opposite effect. "It kind of puts me off when I see people really hyping themselves," states JAKe. McFaul has his own advice: "If your website doesn't have a firm handshake then the commissioner will be shaking the hands of others..."

7 Extra-curricular activities

Careers in illustration are broader than ever, and McFaul thinks that the distinctions are more blurred: "Boundaries between illustrators, photographers, designers, animators and artists are long gone." The list of potential outputs continues to increase too. "I now like to do more of my own work, and then find an outlet for it," explains Miles Donovan of Peepshow. "I just spent a month doing my own thing, and then sold the lot to a T-shirt company in Japan."

8 Eat, drink, breathe illustration

Hard work and determination will pay off, but only if you have raw talent and a visual language that combines creativity, communication and, above all, originality to a high level. If you're still at art school right now, use your time wisely: use the facilities and expertise to their breaking point, because you'll never get another chance. If you're out and working in illustration, ask yourself, "Am I giving it 100 per cent? Do I want this more than anything?"

9 Advice from those who know

It may be tough, but remember a few pearls of wisdom on dark days. "Try to keep a handle on what you enjoy about the process of image-making," offers Jody Barton. "Don't do anything half-heartedly," adds Austin at NEW. Patrick Thomas at laVista believes that "your own projects and sketchbooks will feed your commercial work, and help keep you sane." Finally, Miles Donovan warns: "Don't let the computer dictate what you do!" Wise words indeed.

10 The last word

Illustration may be your entire world, but remember that it isn't everyone else's. "Keep things in perspective," Ian Wright argues. "Being paid to be creative isn't essential to the world's survival!" ■

Below: Ian Wright's Baby Tattoo for [w] www.victionary.com. Wright argues: "Keep things in perspective: being paid to be creative isn't essential to the world's survival!" [w] www.mrianwright.co.uk

Right: Polatronics is an image taken from Neasden's latest book, from Rojo Editions. "There are no lows in illustration," he says. [w] www.neasdencontrolcentre.com

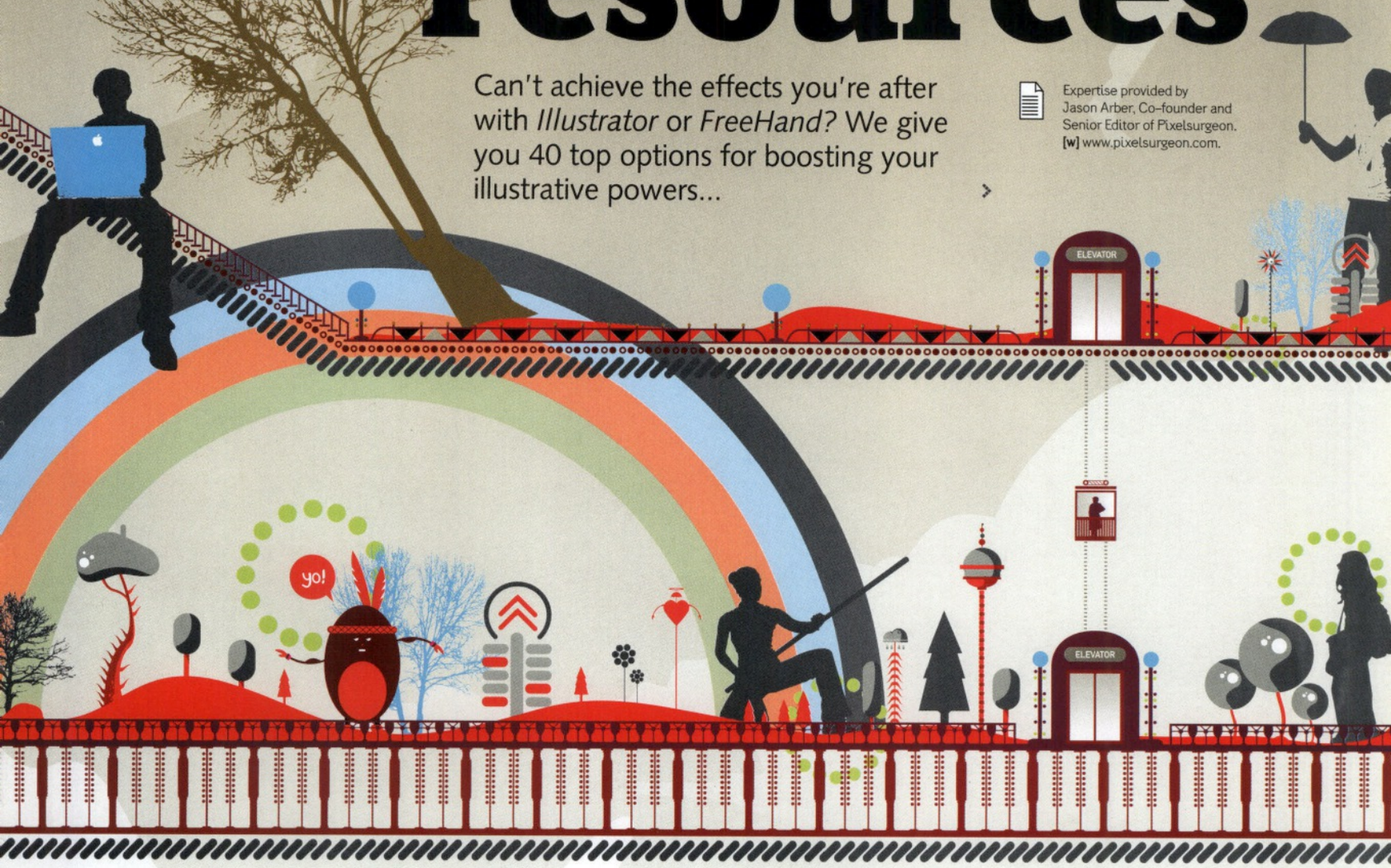
[illustration] Cheeky Sweet Graphics [w] wwwcheekysweetgraphics.com

Feature:

Illustrators' resources

Can't achieve the effects you're after with *Illustrator* or *FreeHand?* We give you 40 top options for boosting your illustrative powers...

Expertise provided by Jason Arber, Co-founder and Senior Editor of Pixelsurgeon. [w] www.pixelsurgeon.com.



No matter how much you love an application, there are times when you find that it doesn't do everything you'd like it to do. However, some applications can be extended beyond their original capabilities with plug-ins and other files and, fortunately for illustrators, both Macromedia *FreeHand* and Adobe *Illustrator* benefit from a plug-in architecture that can dramatically expand the host application's power.

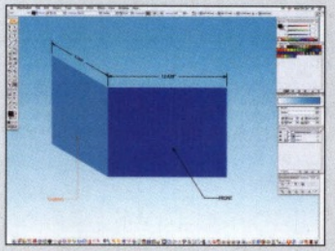
Some plug-ins can transform *Illustrator* or *FreeHand* into CAD drawing environments or fully-featured DTP applications, while others simplify repetitive tasks or add creative features, such as build textures or patterns, or randomise objects and paths. In addition, Adobe *Illustrator* can import third-party brushes, actions, symbols, swatches and styles that can dramatically alter simple paths and shapes. These latter kinds of 'presets' can be constructed and exported very simply by the user, and there's a thriving community of people building and swapping patterns, textures and effects.

Over the next few pages we bring you our selection of some of the best plug-ins, presets and extensions, covering everything from vinyl cutting to packaging to fun, disposable effects. Some of the plug-ins actually cost more than *Illustrator* does, but the good news is that there are a great many that are free, or cost only a few pounds.

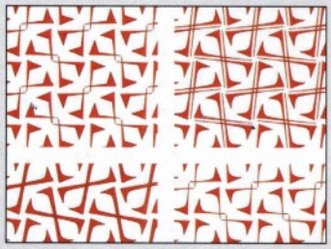
Top 10 plug-ins

1. FILTERiT
www.cvalley.com
FILTERiT is a suite of plug-ins for Adobe *Illustrator* featuring some exciting and unique effects that can create complex artwork very quickly. Apply 3D transformations, warps and lens effects, and turn objects into spheres, doughnuts or spirals with a single click.
Cost: $129

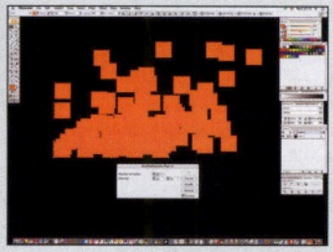
2. CADtools 4
www.hotdoor.com
CADtools contains 57 drawing, editing, labelling and dimensioning tools, grouped into six palettes, which allow you to draw in any scale. New features include wall and wall-editing tools, numeric path division, the ability to snap to 2D or isometric grids and smart trim and extend tools.
Cost: $249



3. SymmetryWorks
www.artlandia.com
SymmetryWorks is a powerful plug-in that enables you to create amazing patterns from the simplest of artwork. Even more amazing is the fact that it's fully interactive, so the base elements can be edited on the fly, resulting in instant updates to the pattern.
Cost: $241



4. Random Touch
www.graphicxtras.com/products/aiplugin20.htm
Add some unpredictability to your artwork with this collection of plug-ins: Background texture for creating high-impact backgrounds from selected paths, images or symbols; Pyramid for creating triangular groupings out of objects; RambleShambles for spray and nozzle effects; or RandomClutter for creating a mess of stars and circles. The *Illustrator 10*-only RandomType plug-in distresses and distorts type.
Cost: £7



PRODUCTION

Cutting Tools plug-in
http://rj-graffix.com/software
The Cutting Tools plug-in from Graffix offers several new ways to cut paths and includes a Hatchet tool, which works like a pumped-up Scissors tool; a Table Saw tool for cutting through paths in a straight line; and the Vector Vac tool, which mops up unwanted paths when dragged through them.
Cost: $5 (Shareware)

Barcode Toolbox
www.yin4yang.com
If you work in packaging then the ability to create and verify barcodes directly within *Illustrator* is a particular blessing. You no longer have to create EPS barcodes in another application and import them into your artwork. Instead, you have full control over the scaling, wide narrow ratio, quiet zone indicators, bearer bars and other aspects of the barcode.
Cost: €79.95

FoldUP!3D
www.comnet-network.co.jp/eng
FoldUP!3D is an absolute godsend for packaging designers, allowing you to design packaging and export the results as a rotating QuickTime movie. FoldUP!3D is easy to use, so even if you're completely new to packaging or dimensional design you should be up and running in no time.
Cost: $379

FlexoStepX
www.flexostep.com
If you use flexography to print labels on to curved surfaces, you'll know what a time-consuming and mistake-prone process it can be. FlexoStepX can be launched from within Macromedia *FreeHand* or Adobe *Illustrator*, and simplifies the process of Stepping, Repeating and Distorting packaging artwork.
Cost: $299

Scoop_CS
http://share.studio.adobe.com
Scoop_CS is an *Illustrator* plug-in that can collect copies of fonts and raster images used in your document or illustration and save them to a new folder, turning *Illustrator* into a fully fledged desktop publishing solution.
Cost: Free

SepPreview
http://share.studio.adobe.com
If you don't have a copy of Adobe *Acrobat Professional* handy, but want to check on your CMYK separations, then SepPreview could be the answer. Better yet, it allows you to print the separations too.
Cost: Free

MagisignCS
www.magisign.com
Magisign is a plug-in solution for *Illustrator* that enables users to create signs from within the application by driving a cutting plotter. There's no need to import .ai or .eps files into dedicated sign software when this plug-in can do everything you need!
Cost: From €599

SPECIAL EFFECTS

Cylinder Distort
www.telegraphics.com.au/sw/info/cylinderdistort.html
An extremely useful filter for creating the impression of artwork wrapping around a cylinder, such as a label on a wine bottle. The same effect can be achieved with *Illustrator CS*'s 3D tools, but it's easier with Cylinder Distort.
Cost: $9

TECHNICAL

Illustrator to XAML plug-in
http://blogs.msdn.com/mswanson/archive/2005/09/16/469670.aspx
One for the techies: a filter that converts from Adobe *Illustrator* format into XAML (short for Extensible Application Markup Language, and pronounced 'zammel'). This is an XML-based language for describing user interfaces, such as those created by Macromedia *Flash*, and can be interpreted on the fly by Microsoft's forthcoming Windows Vista OS.
Cost: Free

Top 10 plug-ins continued...

5. MultiPage 2

www.hotdoor.com

One of the major drawbacks of Adobe *Illustrator* is its lack of multi-page support, but thanks to Hotdoor's MultiPage 2, that problem is a thing of the past. This tool turns *Illustrator* into a powerful DTP application rivalling *QuarkXPress* or Adobe's own *InDesign*. Set up page sizes, margins, page numbering and master pages, and output as multi-page PDFs for on-screen viewing or high-end pre-press.

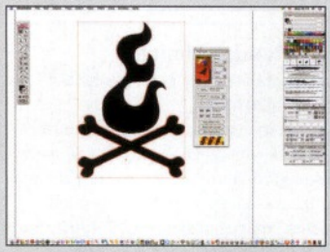
Cost: $79

6. VektorForge

http://share.studio.adobe.com

For those who haven't upgraded to *Illustrator CS2* and its Live Trace functionality, and who don't require Silhouette's complexity (or high cost) then Douglas Habben's VektorForge could be the plug-in for you. It transforms 1-bit black-and-white raster images into vectors, making it the perfect tool to recreate logos when only scans exist. And you can't argue with the price.

Cost: Free

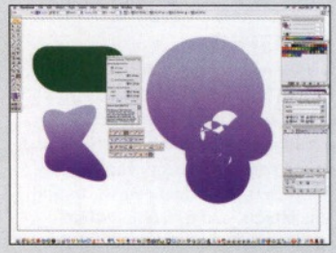


7. Xtream Path

www.cvalley.com

Sometimes wrestling with Bézier paths can be counterintuitive, but help is at hand with CValley's Xtream Path, which enables you to click and drag on paths as though they were made of elastic. The plug-in includes several other path effects, such as Smart Rounding, which can turn angular type into something smoother.

Cost: $139



8. Watercolor (Brush)

http://share.studio.adobe.com

A selection of water-themed brushes from Adobe itself. Taking seconds to download and install, these brushes can turn simple paths into works of art, especially when used in conjunction with different blending modes and opacity settings.

Cost: Free

ENHANCEMENT

Select Menu

http://rj-graffix.com/software/plugins.html#SelectMenu

If you have a large image containing hundreds of elements, you might find *Illustrator's* range of options for selecting objects based on similar colours or line weights a bit limiting. How about selecting objects based on their gradients, or whether the paths are open or closed, or even whether the paths are dashed? With 15 esoteric selection options, you're sure to find one that comes in handy.

Cost: Free

Silhouette

www.cvalley.com

Although *Illustrator CS2* users have a powerful raster-to-vector converter in the shape of Live Trace, users of older versions of *Illustrator* could either boot up Classic to use Adobe *Streamline* or get superb results using Silhouette. The only downside is the price: $289, for which you could probably upgrade your copy of *Illustrator* instead.

Cost: $289

Art Library

www.agetechnologies.com

The Art Library plug-in enables you to create an unlimited number of drag-and-drop artwork libraries that you can use to store your sketches and illustrations. Each library can hold up to a hundred images, which can be sorted by name, and you can view thumbnail previews.

Cost: $110

KamuAlign

www.kamumyasa.com/kamualign/kamualign.html

Adobe *Illustrator* ships with a standard set of alignment tools that can be found in the Align palette, but KamuAlign goes one better, by allowing you to align objects relative to any side or point of any other object or the artboard, and also to align with or without the stroke.

Cost: $24

JLG·Étiquettes and JLG·Cotations

http://perso.wanadoo.fr/jlg.outils/Compteur.html

Simplify the creation of labels for your artwork with JLG·Étiquettes. It packs an amazing amount of flexibility and user-defined options in its various palettes. Font, Arrowhead and other attributes can be modified and edited quickly.

JLG·Cotations is a useful tool for adding precise measurement labels to lines, angles and circle radii. It's perfect for annotating blueprints, scale drawings and other plans.

Cost: Étiquettes €13, Cotations €20

Scriptographer

www.scriptographer.com

Scriptographer is a scripting plug-in for Adobe *Illustrator*. It gives the user the possibility to extend the power and functionality of the application by using JavaScript. This makes possible the inclusion of mouse-controlled draw tools, run-once effects and even timer-controlled animations.

Cost: Free

FREEHAND

Symbols Collection

www.plugin.com

The Symbols Collection is an incredibly diverse and useful library of 6,000 royalty-free symbols for use in *FreeHand MX*. It includes scratchy and splatter symbols, arrows, starbursts, and warped and broken symbols, all for a reasonable price.

Cost: $24

MAPublisher

www.avenza.com/products.mapub50.html

MAPublisher 5.0 is a powerful suite of plug-ins for *FreeHand MX* and *Illustrator 10* that bridges the gap between Geographic Information Systems and high-end graphic design for the creation and printing of high-resolution maps. It's not cheap, but if you make maps for a living, it could easily pay for itself.

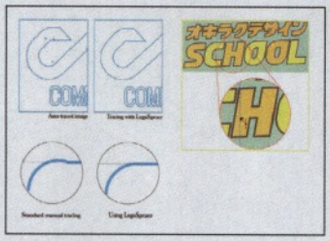
Cost: $999

9. LogoSpruce

www.comnet-network.co.jp/eng

LogoSpruce enables you to tidy up scanned logos from within *Illustrator*. From tracing to precision guide placement and bump-reducing Tangent Arc tools, LogoSpruce has everything you need to create smooth, professional-looking logos from scanned originals.

Cost: $199

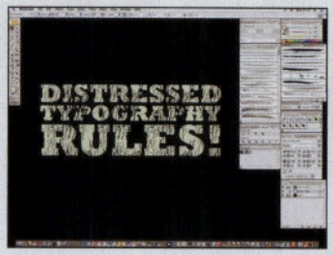


10. Vintage

http://share.studio.adobe.com

Vectors can be a tad clinical and clean, so every now and then it's good to mess things up a bit. Claudio Hohlmann's Vintage set of swatches is just the thing for adding a distressed, aged appearance to your work.

Cost: Free



FreeHand Xtra Extensions

Macromedia *FreeHand's* native plug-in architecture, Xtras, just didn't catch on in the same way as Adobe's plug-in system, which has gone on to become the industry standard. Albeit grudgingly, *FreeHand* now supports Adobe's plug-in architecture to a greater or lesser degree, which means that many of the software add-ons designed for *Illustrator* will work in *FreeHand*. You might experience problems with some of the more complicated plug-ins, which have deeper hooks in the host application, so we do recommend that you download a trial version, if available, before stumping up your hard-earned cash.

Where can I find more?

There are commercial portals dedicated to *Photoshop* and *Illustrator* plug-ins, such as ThePowerXChange (**[w]** www.thepowerxchange.com/category_11.html) and Plugin.com (**[w]** www.plugin.com), but the most vibrant and interesting sources of plug-ins and presets can be found in community-based groups, such as Adobe's Studio Exchange (**[w]** http://share.studio.adobe.com), and design-led forums such as Designerstalk (**[w]** www.designerstalk.com/forums).

SWATCHES AND STYLES

Metal Gradients (swatch)

http://share.studio.adobe.com

This collection of swatches serve one purpose – to simulate metal, and they do it extremely well. From glossy gold to dull steel, this small but perfectly formed collection has all the major bases covered, and can be used as the basis for further experimentation.

Cost: Free

William Morris Thistle Weave (swatch)

http://share.studio.adobe.com

It's a one-trick pony, but what an incredibly well-executed and handy trick. Yitz Woolf has recreated the Thistle Weave pattern by William Morris, the father of the Arts and Crafts movement in the 18th Century. It took Woolf over 20 hours to create the effect, and it's easy to see why.

Cost: Free

Plastic Style (style)

http://share.studio.adobe.com

Plastic Style is a set of five styles that emulate the look of glossy black-and-white plastic. It sounds simple, but Gautch's mini collection is perfect for effortlessly creating a high-tech, sophisticated look.

Cost: Free

Swatches Collection 1 (gradient swatches)

www.graphicxtras.com/products/inswatches1.htm

Creating gradients can be a tedious business, so why not let someone else do all the hard work? The Swatches Collection 1 from GraphicXtras contains many hundreds of useful, colourful and vibrant gradients, creating the look of reflective metals, soft silks and artistic effects.

Cost: £4

Chrome Style (style)

http://share.studio.adobe.com

Does what it says on the tin: a set of styles that can effortlessly recreate the look of multi-coloured chrome. It's not the most versatile set of styles, but when it costs nothing to download and use, who's complaining?

Cost: Free

Individual Round Corners

http://share.studio.adobe.com

If you've had to jump through hoops just to create different rounded corners on a single rectangle, you'll appreciate Kurt Gold's Individual Round Corners library of 15 styles, which makes it possible to give each corner a different radius.

Cost: Free

SYMBOLS AND BRUSHES

Symbols

www.codezebra.com/symbolsillustrator.html

Symbols from Code Zebra is a collection of black-and-white clip art that can be accessed through the Symbols palette. The professional-looking collection, which includes Architectural, Mechanical, Electrical and Landscaping imagery, might seem expensive, but could be a worthwhile investment for architects.

Cost: $89

Page Curl (Symbol)

http://share.studio.adobe.com

If you're going to use Page Curls in your artwork, you could do a lot worse than Kenneth Mata's symbol set, which enables you to add the effect to your artwork in seconds.

Cost: Free

Snowflakes (brush)

http://share.studio.adobe.com

This brush set by Suzanne Powell includes four different snowflake brushes designed to give your artwork a distinctly frosty feel.

Cost: Free

Technology (symbol)

http://share.studio.adobe.com

This slick collection of isometric technology symbols from Ryan O'Donnell will grace any artwork, and includes computers, servers, telephones, ports and more. Best of all, the collection is free!

Cost: Free

MapStudio

www.mapstudio.info/mapstudio/

MapStudio is a set of orienteering symbols for Adobe *Illustrator* that enables you to draw high-quality orienteering maps in no time at all. Another example of *Illustrator's* broad adoption of its plug-in architecture creating niche products.

Cost: Free

Brushes Collection

www.graphicxtras.com/products/aibrush.htm

You may be more familiar with *Photoshop's* brushes, but in many ways *Illustrator's* brushes are more powerful and flexible. The Brushes Collection from GraphicXtras demonstrates this creative ability with a stunning collection of brushes that can create a myriad of unexpected results.

Cost: £17 ■

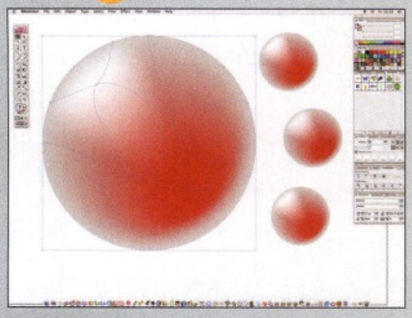
Feature:

40 top tool techniques

Discover the hidden powers of *Illustrator* and *FreeHand* with these essential tips from top designers...

Using *Illustrator* or *FreeHand* is a bit like playing the guitar – you can pick up the basics in a few weeks, but it takes a lifetime to master the instrument. So we're not promising that this collection of tips will turn you into an expert with vector graphics software, but they will put you well on your way. Each one of these tips refers to an obscure or hidden feature of the software that you may not know about, but they're features that can boost your illustration skillset and technique.

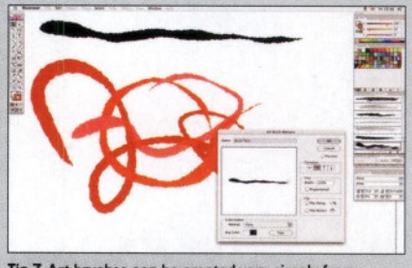
So, fire up your app of choice, or even both, and prepare to delve into the secret techniques that professional illustrators use on a day-to-day basis. Whether you're a novice, intermediate or professional user, there's something for you... >



Tip 1. The Mesh Tool can be used to create extremely realistic-looking globes. These spheres took seconds to create using only three colours.

Tip 3. This interesting effect was created by overlaying several different scribble effects in various colours, and matting them together with several transparency modes.

Tip 6. Use the Symbol Sprayer Tool to create complex, random patterns quickly. *Illustrator* includes tools to modify attributes such as size, colour and direction.



Tip 7. Art brushes can be created very simply from almost any artwork. Drag your design into the Brushes palette, then use the Brush Tool to paint.

Tip 9. Bitmap TIFFs can be placed in your artwork and coloured to match the rest of your design using the Fill colour swatch. Use CMYK, RGB and Spot colours.

20 Illustrator tips

1 Spreading gradients

The Mesh Tool is useful for when you want a gradient to spread out in a random-looking but controllable way. Select the shape you want to fill and click with the Mesh Tool. This creates the initial mesh, which can be filled with colour where the mesh points meet. More clicks increase the density of the mesh.

2 Convert to outlines

Some effects and filters won't work on type unless it has been converted to outlines. Using the Selection Tool, highlight the text you want to work on and choose Create Outlines from the Type menu. Once the typography has been converted, the Bézier points can be edited like any other object in *Illustrator*.

3 Scribbling effects

It's possible to give objects the look of having been hastily coloured in with a pen. This result can be achieved using the Scribble effect. Choose Effect > Stylise > Scribble and a dialog will appear displaying a bewildering array of options. Helpfully, *Illustrator* ships with a useful collection of presets, which can be found under the Settings menu.

4 Magic touches

The Magic Wand Tool in *Illustrator* behaves in a different way to its counterpart in *Photoshop*. In some ways it's more powerful, enabling you to select (or deselect, which is just as useful) objects with the same or similar Fill colour, Stroke colour or Stroke weight. Double-click the tool to bring up the Magic Wand options.

5 Converting to guides

Being able to drag rulers on to a document to act as guides is pretty handy, but did you know that you can convert pretty much any path or object into a guide? Select the path you want to make into a guide and choose View > Guides > Make Guides. The process is reversible should you want to return the shape to its original state (View > Guides > Release Guides).

6 Spraying symbols

The Symbol tools are some of *Illustrator's* most powerful. Choose a symbol from the Symbol palette and, using the Symbol Sprayer Tool, begin to spray instances of the object. The sprayed symbols can be modified using a range of tools that can be accessed by clicking and holding on the Symbol Sprayer Tool's toolbox compartment.

7 Different brush strokes

Brushes are great for adding a hand-drawn effect to your work. There are four types: Calligraphy, which are angled to create the effect of writing with a calligraphy pen; Scatter, which randomly add symbols to the path; Art, which can mimic effects such as charcoal; and Pattern, which add patterned tiles along the path. Brushes can be applied retrospectively to any path.

8 Easy graphs

Creating graphs in *Illustrator* is simplicity itself, and they can look amazing too. Double-click the Graph Tool to define the graph type (there are nine graph types to choose from) and set other options. Click OK, then drag the tool to define the graph area on the document. Enter the data, and then customise the graph's components using the Direct Selection Tool.

9 Colouring bitmaps

Just like the good old days of *QuarkXPress*, bitmap TIFFs placed in *Illustrator* can be coloured. Make sure the file isn't greyscale, RGB or CMYK, and that it's a simple bitmap. Place the image (File > Place), and then, with the TIFF selected, change the Fill colour. Attempting to apply a stroke won't have any effect.

10 Dividing objects

Using the Knife Tool on an object will divide it into pieces, not simply cut the paths in the way that the Scissors Tool does. By default, the Knife Tool cuts in a slightly random, hard-to-predict curve, but you can ensure that it cuts objects in a straight line by simply holding down the Alt/Option key.

11 Spirals and arcs

Creating spirals by hand is a difficult job, but *Illustrator* includes the flexible Spiral Tool to do all the hard work for you. Perhaps even more useful than this is the Arc Tool, which can draw arcs between two points. Usefully, the ends of the arc can snap to Bézier path points for greater precision.

12 Lassoing skills

The Lasso Tool is another way of quickly selecting objects on the artboard. It works in a similar way to the Direct Selection Tool, but unlike that tool, which has the disadvantage of selecting all the points within a dragged marquee, the Lasso Tool can be used to select odd-shaped objects and exclude others, because the selection area is drawn.

13 Experimental warping

Warp effects (Effects > Warp) are handy for distorting type, but most people only use the default settings. Get adventurous, and see what happens when you swap the horizontal and vertical axes, or give the distortion values negative settings. Experiment on other objects – even simple shapes such as rectangles will benefit from some crazy warping.

14 Rasterising effects

Bitmap filters can only be used on raster images, such as placed TIFFs and JPEGs, but you can rasterise any *Illustrator* artwork and then apply the filters to the new bitmap artwork. Select the item you want to convert into a raster image and choose Rasterize from the Effects menu. You're given a choice of resolutions, and can even add a clipping path to the artwork.

15 Inserting glyphs

OpenType fonts offer amazing flexibility and options by including huge character sets. When you want to access the obscure dingbats and alternate characters, *Illustrator* has an extremely useful Glyphs palette (Type > Glyphs). You can't drag and drop, but if you double-click a glyph with the Type Tool it will be inserted into your text.

16 Path attributes

If you've drawn a stroked path, and wish you could stroke the edges of that path or turn it into an object, you can – by outlining the path. By some strange *Illustrator* voodoo, expanding the path (Object > Expand) will not preserve some path attributes such as Round Caps, but outlining the path (Object > Path > Outline Stroke) will.

17 Envelope distortion

Warping tools are great, but sometimes you need to distort an object or text to a specific shape. This would take a lot of hand-tweaking, but with the Envelope Distort command it's a doddle. Make sure the object you want to distort is below the target object that will define the shape of the distortion, and choose Object > Envelope Distort > Make with Top Object.

18 3D mapping

Mapping artwork on to rotated and extruded 3D shapes is easy. Drag the artwork you want to be mapped to the Symbols palette first, extrude your shape (Effect > 3D > Extrude & Bevel) and click the Map Art button. You can step through all the faces that can have art applied by choosing your Symbol from the drop-down menu and resizing if necessary.

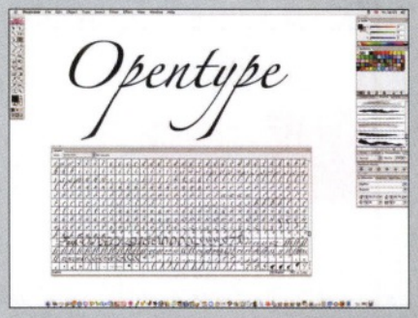
19 Sharp-looking pixels

If you use *Illustrator* to create graphics for the web, Flash interfaces or icons, it may be useful to work in Pixel Preview mode (View > Pixel Preview). At 100 per cent, this looks exactly like using *Illustrator* in normal view, but as you zoom in you can see pixels, rather than smooth vectors. Usefully, points snap to pixels, creating artwork that looks sharp.

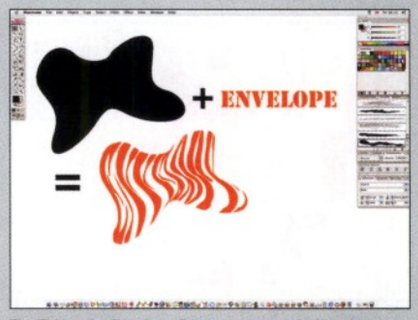
20 Simplifying files

If you want to reduce the number of points on complex artwork, such as *Streamliner* scans, to reduce file size, use the Simplify command (Object > Path > Simplify). Used judiciously, the results can be invisible while removing a great many unnecessary points. At the other extreme, it can be used to create shapes of cartoon-like simplicity that echo their former shape. >

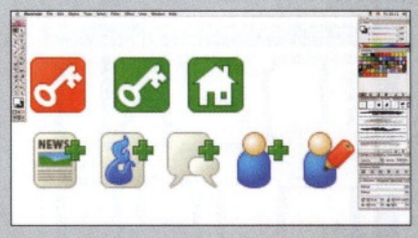
Tip 13. When you're applying Warp effects, see what happens when you swap the horizontal and vertical axes, or give the distortion values negative settings.



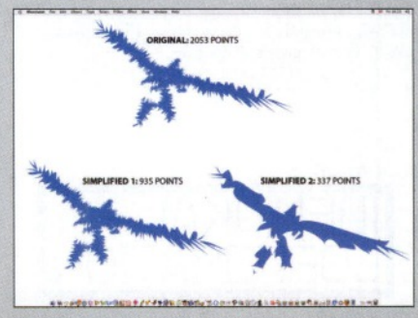
Tip 15. OpenType fonts can have thousands of extra characters. *Illustrator's* Glyphs palette takes the strain out of trying to remember where they all are.



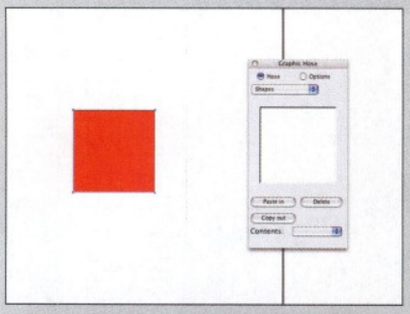
Tip 17. Use the Envelope Distort command when the Warp tools aren't up to the job. This feature enables you to distort an object into a specific shape.



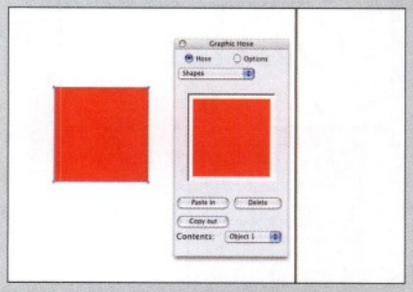
Tip 19. Pixel Preview mode is great for creating artwork for websites and interfaces at a fixed resolution. Points snaps to pixels, so your artwork looks sharp.



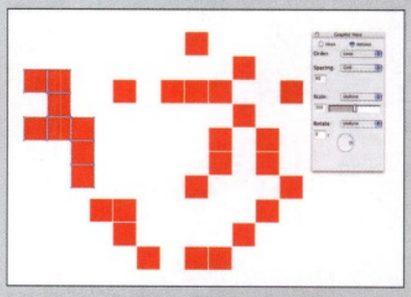
Tip 20. Too many control points in your artwork threatening to choke imagesetters or Flash? Reduce them with the Simplify command.



Tip 2. Selecting a shape that repeats well is essential when using the Graphic Hose tool. A square is the simplest and perhaps most effective choice.



Tip 3. Loading your Graphic Hose is easy. Open the Graphic Hose window, give your hose a name, then copy your chosen shape into the window.



Tip 4. To create effective patterns with your Graphic Hose, set the Spacing to Grid and the Order to Loop, then experiment with different effects.

Tip 7. Using the Smooth/Rough tool you can roughen the edges of your type to make it look aged, or to look like it's been through a photocopier.

Tip 11. Don't be tempted to use excessive levels with the Rough/Smooth tool. An Amount value as low as ten will often give you the best result.

20 FreeHand tips

1 Quick and effective results

The Graphic Hose feature is a bit of an unsung hero of the *FreeHand MX* armoury – not many designers appreciate the benefits of using this clever little device, thinking of it more as a gimmick. It not only saves time in creating patterns, it can also be a fantastic creative tool for producing striking and innovative illustrations.

2 Use the correct shape

When using the Graphic Hose tool, make sure you use a shape that repeats well. Usually the best form or shape can fit into a square. When you're using a grid to create a pattern out of your desired shape, you'll soon reap the benefits. A square-based shape works very well as a repeat pattern, and can be used to produce great tonal effects.

3 Loading your Graphic Hose

The easiest way to get your shape into a Graphic Hose is to copy the shape using Ctrl/Cmnd+C. Then, in the Graphic Hose window that appears, create a new hose by using the drop-down menu at the top of the window. Once you've named your new hose, you can then paste your copied shape into the new Graphic Hose window.

4 Creating patterns

Although you can use the Graphic Hose to create random illustrations from various objects, it's a tool that's best used to create patterns and images out of small shapes. Using the Spacing drop-down menu, you should always set your hose to a Grid – this is used to the best effect when the Order of the shape is also set on a Loop.

5 Tracing photography

The Graphic Hose tool can be used to great effect to 'trace' photographs. Import your photograph into a separate layer in *FreeHand MX* and create another layer for your Graphic Hose. Using the tool with the correct settings will help you create great illustrations. Always use a tight grid with a shape that works well to bring out the details of your photograph.

6 Using multiple shapes

You can use numerous shapes in your Graphic Hose to enhance your patterns and illustrations. Again, you need to pick your shapes wisely, and copy each shape one after the other into your hose. This effect works best with typography, where you can create a phrase or word out of your Graphic Hose and use it to add extra detail and messages within your illustrations.

7 Rough/Smooth options

Leaving the Graphic Hose behind, we move on to *FreeHand MX*'s Rough/Smooth options, which can be used to add detail to shapes and clean-looking objects within your work. It can also be used cleverly to roughen up your type for a 'vintage' look, especially if you're trying to create the effect of a stamp or photocopied document as in this image.

8 Turn text into outlines

If you're going to roughen up typefaces, you'll need to turn them into outlines before using the Rough/Smooth options. The best way to do this is by getting your typography set exactly as you want it, then using the shortcut command Ctrl/Cmnd+Shift+P.

9 Work at large sizes

To get the best results from the Rough/Smooth options you should always work at a large scale, as using the tool at smaller sizes won't enable you to get the most out of them. When you've created the shape or typography you want to roughen, you can increase its size before using the Rough/Smooth options.

10 Circular shapes

The Rough/Smooth options lose some of their magic when used on circular shapes, so try to avoid using them on shapes that are predominantly round, or have complex curves. The straighter the edges of your shape, the better the effects you can expect; the more complex the shape, the harder it is to use these effects to their best advantage.

11 Less is more

It's easy to get a little carried away with the Rough/Smooth options, but bear in mind that these are effects that benefit from being used sparingly; you'll find that the less intense the effect, the better the results. Using too much of any effect can make your artwork appear 'overcooked'.

12 Connector tool textures

The Connector tool in *FreeHand MX* was designed to be used for flowcharts, and for linking boxes or shapes to each other within presentations and data files, but you can also use it as a creative tool to get things done quickly and effectively. As it creates lines and arrows, it can be used for textural effects that look great when adding details to your illustrations.

13 Link your flowcharts

To use the Connector tool effectively you need to highlight one box within your flowchart with your cursor, then click, hold and drag to link each box with a separate arrow. You can then do the same with other boxes, and link them all together in exactly the same way. This saves you the hassle of having to draw individual arrows and lines for each box.

14 Illustration effects

Because the Connector tool is great for linking shapes to each other with a separate line and arrow, you can use it to create many linear layers and effects in your illustrations. Continually link shapes with the tool until you have many different layers and links all over your illustration; this will create a detailed effect of lines and arrows.

15 Merging shapes

The Blend tool in *FreeHand MX* is a feature that can enable you to create a number of interesting variations for linear illustrations. By clicking on two different shapes and blending them, you can create a 'metamorphosis' between the two that merges colours and line thickness, as well as shapes, throughout the stages of the blend.

16 Clever blending tricks

This is a clever way to add a twist to your use of the Blend tool. Choose two shapes that you want to blend together, and click on certain points of each shape. When you merge the two shapes the blend is distorted, so you end up with a twisted abstract effect of the images morphing together at different points.

17 Line thickness

Make the outline point size of one shape really thick, and that of another shape hairline thin. Don't fill the shapes with any colour. When you merge them using the Blend tool they'll combine gradually from a thick outline to a thin outline. Because the shapes have no fill, you can also see the beauty of the process underneath each shape.

18 See-through effects

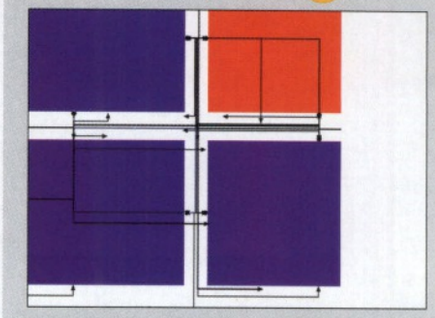
The Transparency effect is created by going to the Object section of your Graphic Tool menu. First, make sure your object has a solid colour in it. Then highlight the colour in your Object menu and you'll see a pull-down menu headed with Basic. Click and drag down this menu until you get to Lens. In the Lens menu you can experiment with the Transparency effect.

19 Colour effects

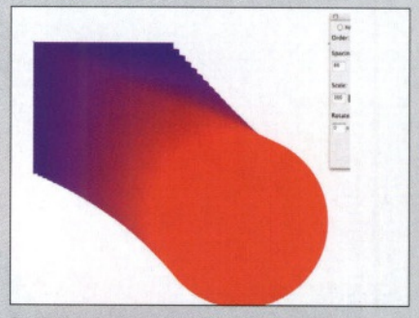
The Transparency effect is best used for mixing shapes and colours. You can overlay one shape of red on top of a solid blue colour, and then turn the red shape into a Transparency object – this mixes the two shapes together, and you're left with a purple colour where the red shape has overlaid the blue shape.

20 A whiter world

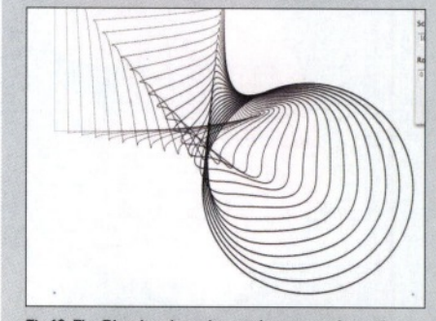
Try using white as the main colour for your Transparency effects. You'll find that you can add fantastic light, layered effects to your work in this way. Use these white effects to create windows in vector illustrations, or for adding tonal effects of light to areas of an illustration. You can also experiment with overlapping white layers. ■



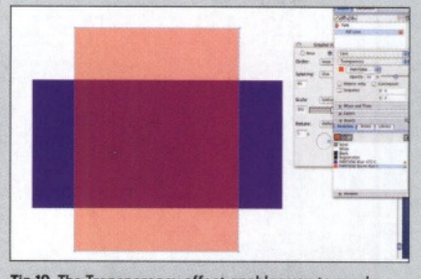
Tip 13. Use the Connector tool to link flowcharts together so that you don't have to draw separate arrows and lines for every box.



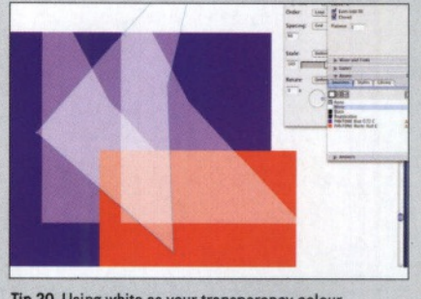
Tip 15. Use *FreeHand MX's* Blend tool to merge different shapes, such as a square and a circle, to create some interesting effects.



Tip 16. The Blend tool can be used to create dramatic, abstract twisted shapes, again from merging two shapes together.



Tip 19. The Transparency effect enables you to overlay coloured shapes to achieve the colour blends you would get if you were mixing paint on a palette.



Tip 20. Using white as your transparency colour enables you to create windows in your vector illustrations, or to add tonal effects.

Tutorial

CREATE YOUR OWN GRAFFITI FONTS

Create graffiti in your own style by building handwritten font sets in Photoshop, Illustrator CS2 and Fontographer...

[artist] Will Barras [web] www.willbarras.com

Most of us walk, cycle or drive past graffiti every day, often without being fully aware of the tags, outlines and pieces that adorn our urban environment. Graffiti is strategically placed on buildings and billboards that are impossible to overlook or in obscure spots that are like little treasures when discovered.

As the graffiti phenomenon that began in New York in the 1970s has spread across the world, different cities have developed distinct styles, providing plenty of inspiration for the designer. In this tutorial, we're going to use some of these ideas to create a graffiti font.

If you already have a graffiti style of your own, or know a graffiti writer who can produce some lettering for you, then the work will be easy to convert into a font. If you're less familiar with graffiti, grab your camera and get outside. Take pictures of graffiti letters, tags, throwups – whatever pieces you find that capture your attention – and begin to practise the different styles by hand until you find one you're pleased with; in doing so, you'll quickly realise the close relationship that graffiti shares with typography and graphic design.

If you don't have the time to create your own graffiti font you'll find a hand-styled design on the CD that will enable you to follow this tutorial. To complete the tutorial successfully you'll need to be competent in *Fontographer*, *Photoshop* and *Illustrator CS2*.

Expertise provided by Stephen Faustina, the art director on Francis Ford Coppola's *All-Story* magazine and a mainstay of graffiti culture, both in conventional media and on the street. See more at [w] www.sfaustina.com.

The components needed to complete this tutorial can be found on the CD, in the Tutorial Files > Create Your Own Graffiti Fonts folder.

Part 1: Getting started

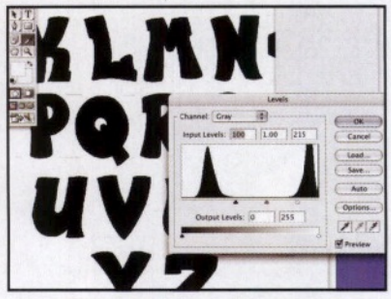
Design a character set, and convert it to vector-based shapes

Biting

Any graffiti you gravitate to is solely a piece of inspiration to get you creating your font set. In graffiti culture, to directly copy a writer's letters or style is referred to as biting. We've provided a few examples, from San Francisco, on the CD: look in the Inspiration folder.

1 Test out different felt pens, such as pilots, paint pens and ultra-wide markers. The darker the ink, the easier it is to convert to vector. Explore ink flows and tip thicknesses: these can contribute to your own graffiti style. Keep repeating the alphabet, including arrows, asterisks or simple characters that you want in your graffiti font set.

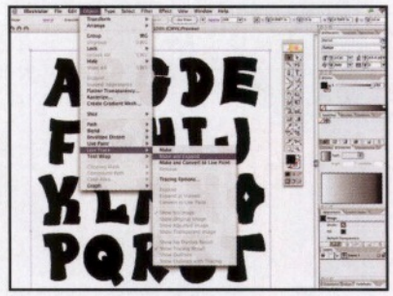
2 After you've found a pen and a style that you're comfortable with, start writing out your full character set in sequence. Make sure the letter size and styling stays consistent: pay attention to consistency in shapes, such as with ascenders and descenders. The CD includes examples for reference or to use in the rest of this tutorial.



3 Scan the sketches into *Photoshop* in greyscale mode at 300dpi. If you're using the CD examples, open beef.jpg in *Photoshop*. Now we'll darken the letters so they're solid black, making it easier to convert the letters to vector. Choose Image > Adjustments > Levels. Set the Input levels to 100, 1.00 and 215. Select Layer > Flatten Image.

4 Using the Eraser Tool, clean up the corners of the characters and any spots, dust and pencil marks you find around each letter. Smooth out any abrupt inconsistencies in the lines, ready for when the letters are converted to vector. When satisfied, save the file as beef.tif and close.

5 Now launch *Illustrator CS2* and open the beef.tif file. Next, we're going to convert the letters into vector art using the new Live Trace feature in *Illustrator CS2*. If you don't have *Illustrator CS2*, you can create your vectors in either *Streamline* or *Corel Trace*.

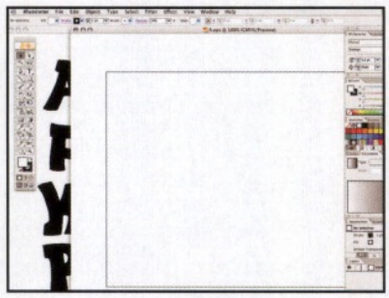


6 To create your vectors in *Illustrator CS2*, select the letter file and go to Object > Live Trace > Make And Expand. If a dialog box appears saying, 'Tracing may proceed slowly', click OK to continue. *Illustrator* now converts each shape to a vector.

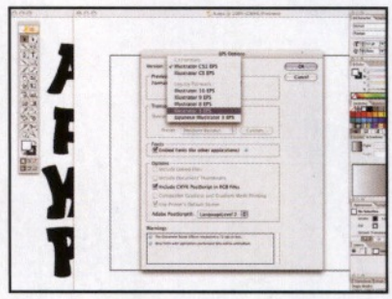
Part 2: Building your alphabet

Create a template so that your font set is consistent

1 Now that your letters have been traced and vectorised, you'll need to ungroup all the letters. With all the letters still selected, go to Object > Ungroup. Deselect the letters.

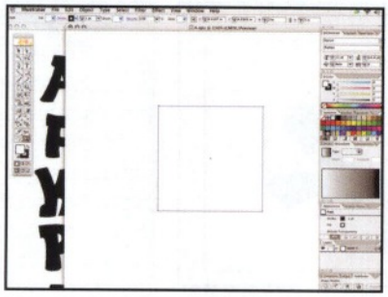


2 Save this *Illustrator* file and name it letterstage.ai. At this point, we're going to start building our first letter of the alphabet. Keep the letterstage.ai document open, then create a new *Illustrator* document. Name it A.eps, and make the artboard A4, with a landscape orientation.

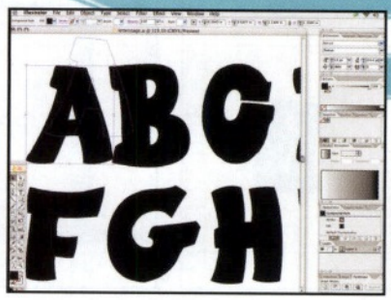


3 We must change this file to an *Illustrator 3* EPS to enable its import into *Fontographer*. Select File > Save As from the Format drop-down menu, then select Illustrator EPS and click Save. The EPS Options window will open. Select Illustrator 3 EPS from the Version dropdown menu and click OK.

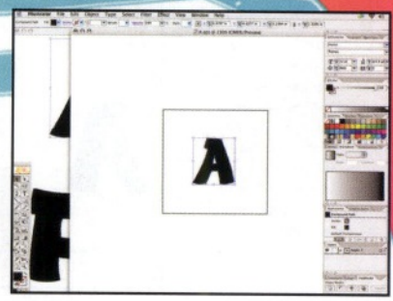
Building your alphabet, continued



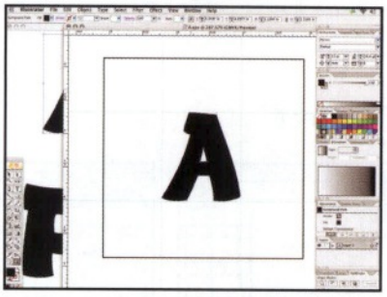
4 In the A.eps file, use the Rectangle Tool to create a 3x3-inch 1pt stroke with no fill square in the middle of the artboard.



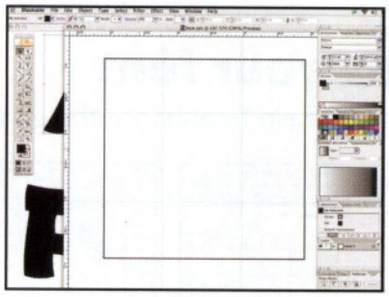
5 Go to your letterstage.ai document. With the Selection Tool, select the letter A from your alphabet. Make sure not to select any of the white mask area that was created by the Live Trace process, and also make sure that only the points forming the letter A are selected.



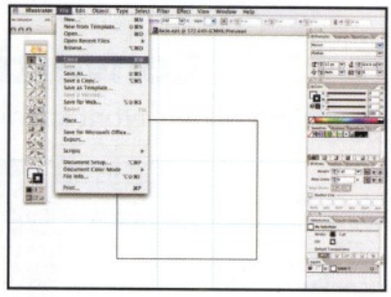
6 Drag the selection on to the A.eps document, and position the letter in the middle of the 3-inch square.



7 Now drag in guides around each side of the letter A, enclosing the area it occupies, and save the A.eps file.



8 We'll now use this document and its guides as a template for the remaining characters, as well as for future fonts. Delete the letter A, then use Save As to save a new version of the file, naming it base.eps. Make sure it's an *Illustrator 3* EPS, as you did before.



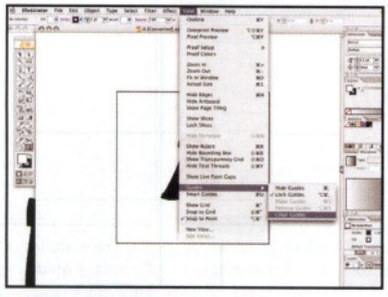
9 The area defined by the guides will be used for each letter hereafter: the top and bottom of each letter needs to fit within the guides. If a letter is too small or too big we'll simply scale it to fit within the guides. Now close the base.eps file.

Part 3: Creating more letters

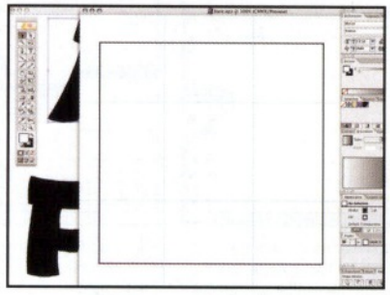
Make individual files for each character in your font set

Straight-letter styles

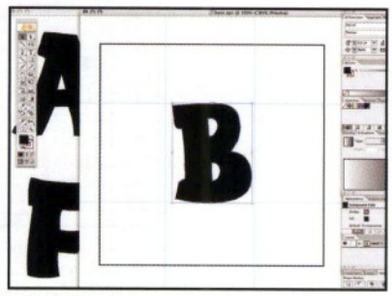
On the CD, SKERT is an example of a straight-letter graffiti style: the letters are neither bubble-style, common in throwups, nor abstract, common to piecing. If this is the style you want to achieve, this is a great photo to work from.



1 Open your saved A.eps file. We need to clear all the guides, because *Fontographer* will have problems with these when it imports the EPS files. Go to View > Guides > Clear Guides. Save the file and close. Well done: you've just completed your first graffiti letter.



2 With the letterstage.ai file still open, we're going to reopen the base.eps file that we created earlier. You should have a blank document with guides.

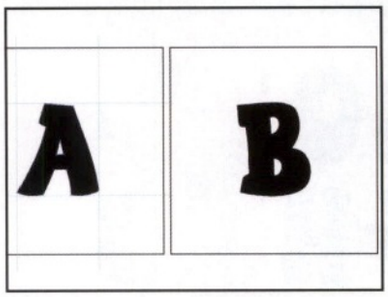


3 Go back to the letterstage.ai file and select the letter B, making sure you select only the points forming the B. Drag it to the base.eps file.

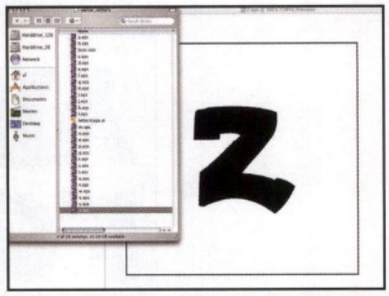
Creating more letters, continued

Overlapping letters

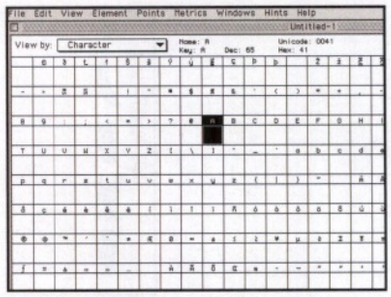
On the CD, ADIOS demonstrates a key element of graffiti: the use of overlapping letters. Rarely on the streets will you find a graffiti writer who leaves behind their word without at least one pair of overlapping letters. If your goal is to achieve an authentic street feel for your font set, overlapping letter spacing is essential.



4 Position the shape in the centre of the guides. Optically scale the letter to the same height as the A. Now go to View > Guide > Clear Guides. Use Save As to rename the file B.eps, then save it alongside your A.eps file, again making sure it's an *Illustrator 3* EPS.



5 Repeat this procedure until you have all the letters for your alphabet. Save each letter as an *Illustrator 3* EPS file, and name each letter accordingly. Remember to remove the guides before saving each letter: you can use Edit > Undo to reinstate the guides quickly, rather than reopening the base.eps file each time.



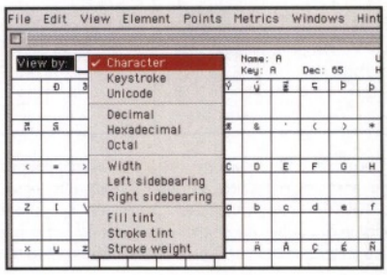
6 We're finished with *Illustrator*, and are now going to launch the *Fontographer* application. You can use *Font Lab* instead if you prefer. Once *Fontographer* is opened, select File > New Font. Your work area, containing all related characters of a font, will be in this window.

Part 4: Converting your font

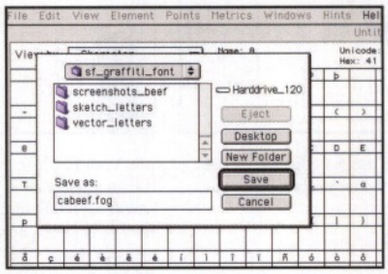
Paying attention to font spacing will help to enhance the graffiti effect

3D shadows

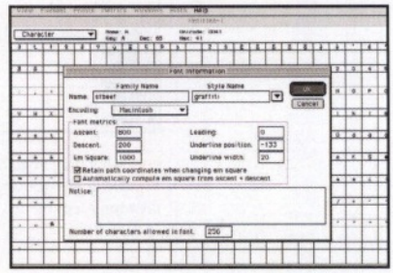
A 3D-effect shadow is an essential element of graffiti: it makes the writing more noticeable. On the CD, OBCES is an example of frontward 3D shadowing. The best thing to do is experiment with shadowing until you get an effect you like.



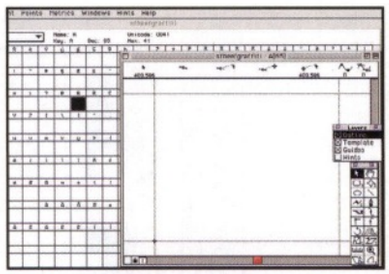
1 By default, the *Fontographer* work area window's View mode should be Character mode: if it isn't, change it now using the View By drop-down menu.



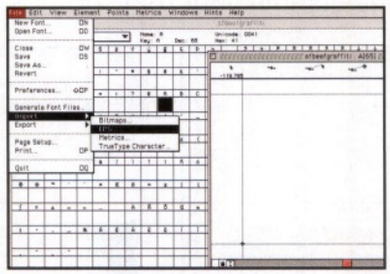
2 Name and save this *Fontographer* file as cabeef.fog. Now it's time to make this graffiti font official by giving it a name.



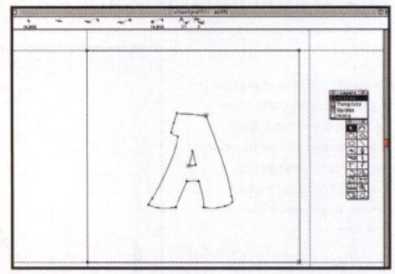
3 Select Element > Font Info: the Font Info dialog will appear. Under Family Name, type 'sfbeef', and under Style Name, type 'graffiti'. Click Okay. Now let's prepare to import all the *Illustrator* letter files we made.



4 Double-click the capital letter A, opening another window with the Tool palette. We'll now import the first letter in the capital A character window. You can follow this technique to import any type of EPS graphic, including elements such as arrows and asterisks, to enhance your font set.

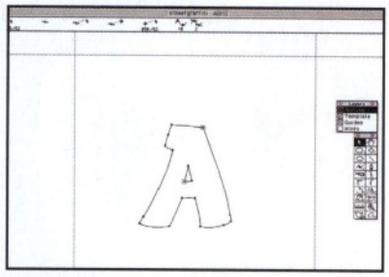


5 Go to File > Import > EPS. Select the folder enclosing your characters, and choose A.eps. Click Open.

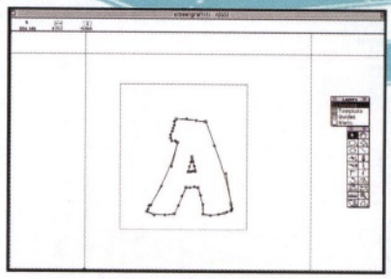


6 The A.eps letter file now appears in the middle of the window, as an outline preview of the letter. You'll notice that the square we made around the A in the *Illustrator* EPS file is still there.

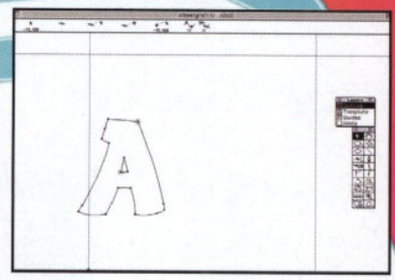
Converting your font, continued



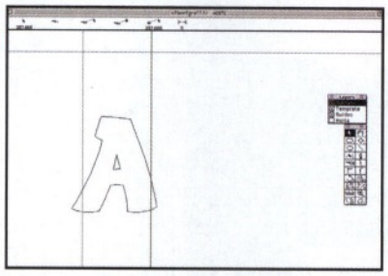
7 Using the Selection tool, we'll delete the four corner points that make up the square. It's easiest to delete two points at a time by dragging the cursor over the two top points and deleting, then repeating the step for the bottom two points. Make sure not to select any of the points forming the letter itself.



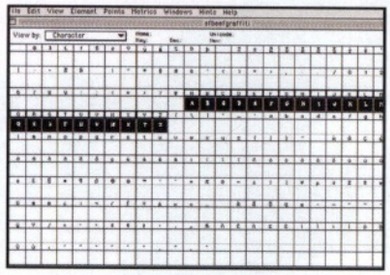
8 Now we're going to move the letter A to the left, creating graffiti-style letter spacing for the final font. With the Selection tool, highlight the entire A.



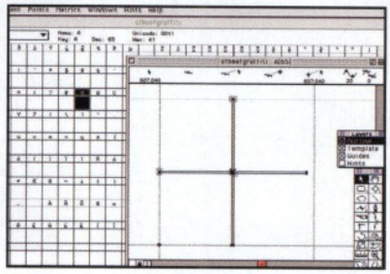
9 Use the left arrow key on the keyboard to move the letter until it slightly overlaps the left vertical line. Deselect the letter.



10 Pull the right-hand vertical line to the right side of the A: the proximity of the lines to either side of the letter determines the letter spacing when the font is in use. Graffiti writing is usually executed so that letters touch or overlap. Experiment with the spacing until you're satisfied.



11 The letter A is complete, so you can now close this window. Repeat the import and alignment procedures for the rest of your alphabet, remembering to import each letter into its correct letter window. Remember to save the cabeef.fog file periodically to preserve your work.



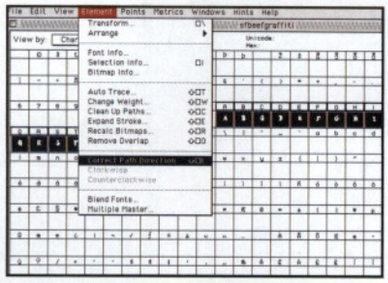
12 If a cross graphic appears in the window when you import any character, it means you forgot to delete the guides on your EPS file. Simply go back and clear the guides, then re-import the EPS file.

Part 5: Finishing your font

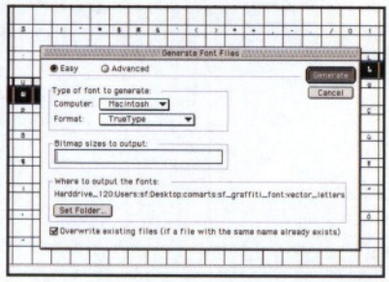
It's time to convert your characters into a true font

More inspiration

To get more ideas, check out the books *Subway Art*, *Faith of Graffiti*, *Getting Up*, *Spraycan Art* and *Bloodwars Volume One*; and the videos *Style Wars*, *Beat Street*, *Quality of Life*, *State Your Name*, *Piece by Piece* and *Wild Style*.



1 After importing each EPS letter into its appropriate box, choose Edit > Select All. With all the letters selected, choose Element > Correct Path Direction: this will remove any overlapping shapes or unwanted paths. The last step is to generate the font file.



2 Select File > Generate Font Files. The Generate Font Files dialog will appear, and the Easy option should be selected by default. Under 'Type of font to generate', choose between Mac or PC for the Computer option. For the Format option, select TrueType. Click the Generate button to finish.

3 Now load the TrueType file into your font library and test it out. Make sure the Caps Lock key is selected as you type: the graffiti font is placed in the upper case character windows of *Fontographer*. You can always go back into your original cabeef.fog file to resize letters or adjust spacing. ■

ROTTEN
COTTON

Tutorial

[illustration] Christopher Lee **[w]** www.thebeastisback.com

Adding depth to your characters

Are your designs looking a little flat? We show you how to make your creations leap off the page by creating the illusion of depth

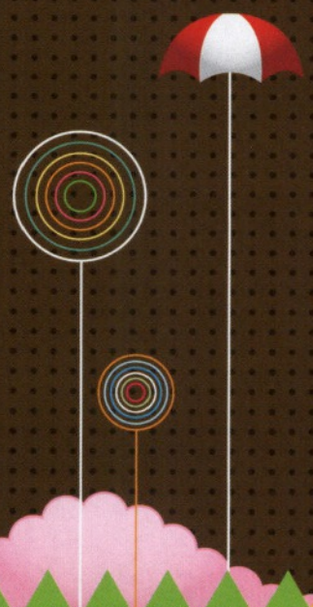
When most people hear the words 'vector art' the first things that probably come to mind are flat shapes and solid colours. In the ever-changing world of digital character design, your personal style almost always determines your illustrative technique, and while some styles suit the 'flat' effect, others will require a little depth to create more of a three-dimensional effect.

In this tutorial we're going to show you how you can add the illusion of depth to even the most simple vector illustrations by combining the effects of *Illustrator's* versatile linear and radial gradients. Along the way we'll also demonstrate how subtle (and believable) accents can be applied to your illustrations to increase their visual appeal.

By working with the basic tools of *Illustrator*, including the Transparency and Pathfinder functions, and combining these with more complex features such as clipping masks, you can easily create a dynamic vector illustration that breaks the stereotype of 'flatness'. In order to follow the tutorial you'll need access to *Illustrator CS* or *CS2*.

Expertise provided by California-based illustrator and designer Christopher Lee. His character series entitled *The Urbanites* is being transformed into a vinyl toy line. Find out more at www.thebeastisback.com.

You'll find the original sketch of this composition on the CD, in the Tutorial Files\Adding Depth to your Character folder.

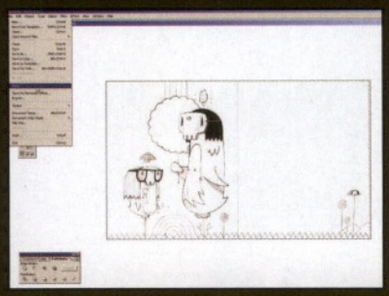


Part 1: Preparation is everything

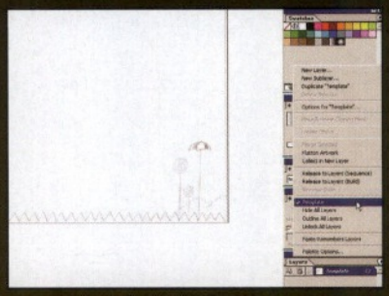
First you need to set up a document for your illustration in *Illustrator*...

Planning your composition

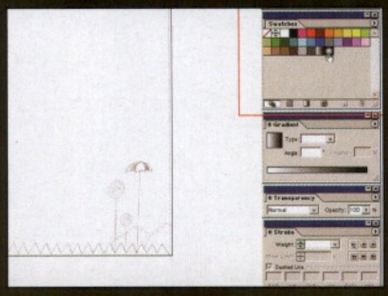
Strong character designs should evoke an audience response even before they've been perfected in a graphics program such as *Illustrator*. When designing characters that are more 'graphic' in nature, as opposed to ones drawn in a more realistic style, it pays to apply some basic design principles such as composition, colour and hierarchy, to make your work that much stronger.



1 Select File > New and create a document measuring 480x290mm – this will be the art board for your illustration. Open the sketch file provided on the CD (sketch.jpg), and place the image in the document (File > Place).



2 In the Layers palette, lock the layer and change the layer type to Template in the expanded options. Rename this layer Template.



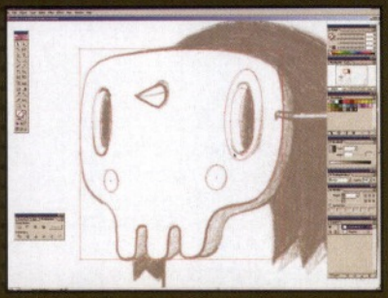
3 Clean up your Swatches palette by trashing all but your basic linear, radial and standard solid swatches. This will make colour management easier down the line.

Part 2: Bringing your character to life

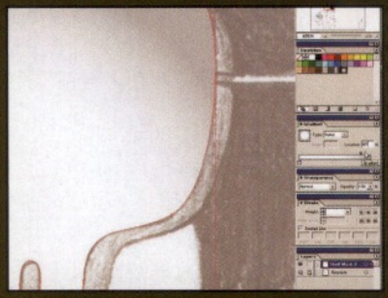
This character's most distinctive feature is its mask. Here's how to create it...

Traditional techniques

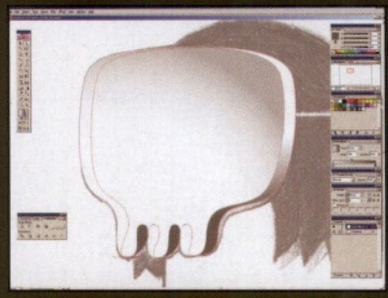
Although you may be using a cutting-edge program to produce your final image, what will really make or break your illustration is how effectively you employ traditional drawing techniques... yes, we mean pencil to paper. Light, shadow, texture, dimensions, perspective and line quality all play a crucial role in the impact your digital illustration will have.



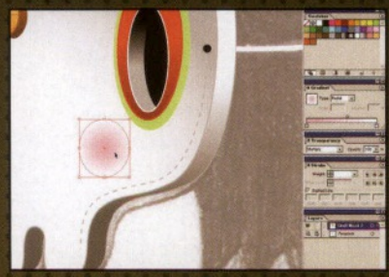
1 Create a new layer for the mask and call it Skull Mask 2. Begin following the contours of the drawing, and create the basic shape of the mask, eyes, nose and other details. Next you'll add some depth to the skull and its elements.



2 Select the skull, and then select the black-and-white radial gradient from the Swatches palette. Replace the black swatch with a 30 per cent black swatch. Change the Location of the Gradient Slider to 87 per cent, then apply it with the Gradient tool. Give the skull a 0.5pt stroke.

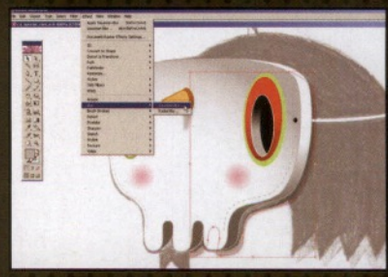


3 Copy the skull and paste it behind the original image (Ctrl/Cmnd+B). Shift it over to the right, and adjust the bottom points of the teeth with the Direct Selection Tool as above. Fill this duplicate skull with a linear gradient of white and 60 per cent black. Give this skull a 0.5pt stroke.



4 Add a linear gradient to the eye socket to simulate light and shadow. Fill your circles with a radial gradient (pink to white) for the flushed cheeks, and set the blending mode to Multiply. Experiment with placing additional elements on the skull.

5 Create a triangle underneath the beak and apply a Gaussian Blur (Effect > Blur > Gaussian Blur) with a value of 1.0. Set the object blending mode to Multiply. Drop shadows add realistic accents, and play a major roll in creating depth in the finished illustration.



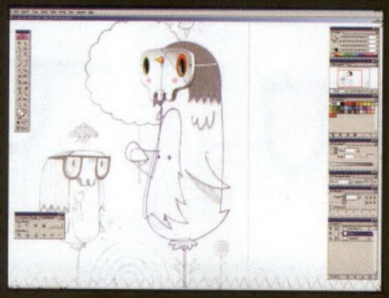
6 Create a shadow underneath the skull using the technique in the previous step. Follow the contour of the skull with the Pen Tool, and fill that section with 30 per cent black. Add a 1.0 Gaussian Blur, and set the blending mode to Multiply. The skull should now look like it's resting on top of the face.

Part 3: Clean lines

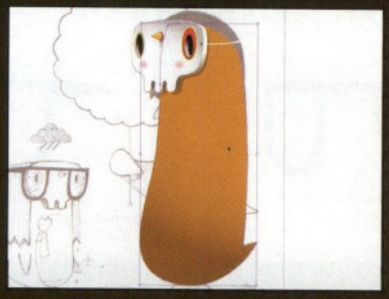
Keep everything clean and streamlined with clipping paths…

To mesh or not to mesh?

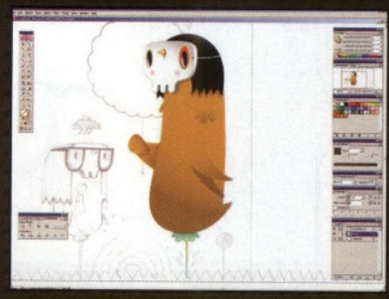
When used to their full capability, gradient meshes can produce stunning levels of realism in *Illustrator*. However, alternating between linear and radial gradients (as in this tutorial) can provide an equally convincing impression of depth, without the complexity. Consistency is the key: always remind yourself where your light is coming from, and where shadows should fall and draw your gradients accordingly.



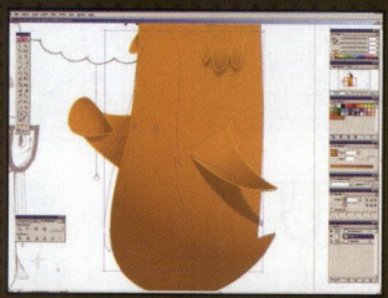
1 Create a new layer under Skull Mask 2 called Body 2, and begin drawing the body of your character. When drawing the belly texture, make sure you draw the shape beyond the contour line of the body – we'll come back to that in a moment.



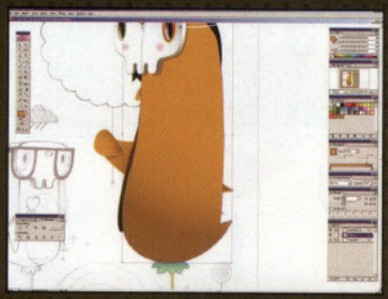
2 Repeat Step 2 in Part 2, and add a radial gradient to the main body shape; don't forget to set the Gradient Slider to 87 per cent. The harsh transition between the two colours helps with the illusion of roundness. Apply the gradient until you achieve an effect similar to that shown above.



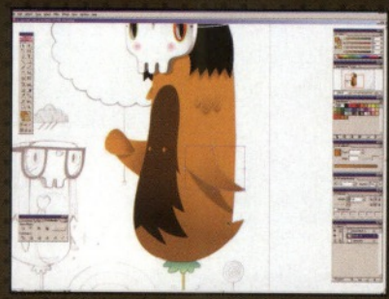
3 Continue adding the rest of the elements using linear gradients, maintaining consistency between light and shadow. Add your drop shadows at this point as well. Experiment with larger Gaussian Blur values to vary the softness of the shadows you're placing.



4 Notice how we've drawn over the body contour on these two shapes. This wasn't a mistake – we'll be masking those shapes with the same lines of the body to create a single, seamless shape. With a mask, there will be no issues of alignment with the edges of the body.



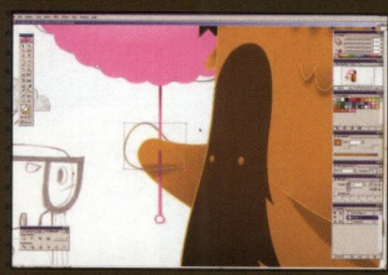
5 Before we mask, let's add a radial gradient to the belly shape. Select the main body, and copy and paste in front (Ctrl/Cmnd+F) then bring to front (Ctrl/Cmnd+Shift+]). You should now have a duplicate body above the rest of the shapes.



6 With the duplicate body still selected, Shift-click the belly shape and arm drop shadow to add them to your current selection. You should now have three items selected. Create a clipping mask (Object > Clipping Mask > Make) to achieve a continuous body line. Select the arm and bring it to the front, or it will appear behind the drop shadow.

7 Draw a circle to use as a guide for the candyfloss. Draw a smaller circle at the top of the circle guide, then press Alt/Option and drag the shape to the bottom to duplicate it. Group the two smaller circles, copy them, paste them in front (Ctrl/Cmnd+F) then rotate. Repeat this process until the perimeter of the circle is closed.

8 Draw another circle in the centre of the one you've just constructed. Select the entire candyfloss shape (including the new circle) and Alt/Option-click to 'Add to shape area' in the Pathfinder palette. All your little circles, as well as the large one, will be combined to create a single shape. Apply a suitably candyfloss-coloured radial gradient.



9 Now draw a rectangle as a stick for the candyfloss. You'll need two rectangles to complete the illusion, one below the hand and one directly behind the arm. The hand is shown without a fill here so you can see the set-up. Apply a gradient to create shadows where appropriate.

Part 4: Transparency effects

Here's how to give some chic glasses a realistic touch...

1 Create a new layer named Glasses. Construct the basic frame, and make sure the area where you'll be putting the transparent lenses is hollow.

2 Add a lens shape behind each eye opening. For a trendy 'Hollywood' look, fill the lenses with a linear gradient running from burnt orange to pale yellow.

3 Change the object opacity of each lens to 55 per cent. Add some white highlights to the glasses and change their opacity to 60 per cent. Now create a drop shadow for the glasses, using the same techniques as for the skull mask. Change the drop shadow's blending mode to Multiply.

Part 5: Other characters

It's time to give our smaller character some attention...

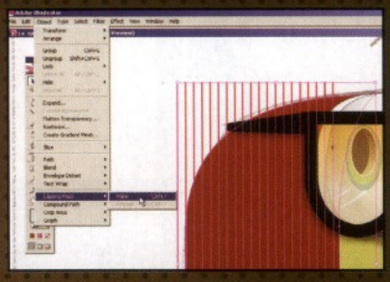
Gaussian Blur versatility

In this tutorial we use a Gaussian Blur to simulate a drop shadow without actually using *Illustrator's* built-in drop shadow effect. Try using Gaussian Blur with varying values on other shapes to create clouds or mist. Layering objects with Gaussian Blurs and varying opacity values adds a three-dimensional, dream-like atmosphere to your compositions.

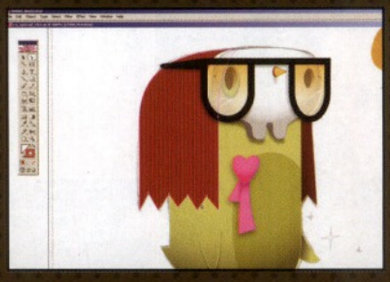
1 Lock and turn off the Glasses layer and create two new layers: Body 1 and Skull Mask 1. Build the skull and body using the same techniques as for the main character. Don't add the texture lines to the hair just yet – concentrate on getting the skull mask and body drawn and coloured.

2 Now let's focus on getting that hair textured. Select the Line Segment Tool, and draw a line that extends above and below the hair shape. Hold Shift, and Alt/Option-drag the line over to the right to duplicate the line. Step and repeat (Ctrl/Cmnd+D) the line until it fills the entire hair shape.

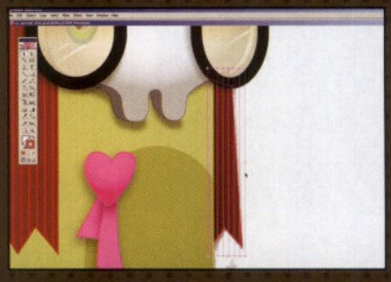
3 Select all the lines you've just drawn and group them (Ctrl/Cmnd+G). Select the main hair shape and copy and paste in front (Ctrl/Cmnd+F) then bring to front (Ctrl/Cmnd+Shift+]). You now have a duplicate hair shape above the other shapes.



4 With the hair still selected, Shift-click the grouped set of lines and then go to Object > Clipping Mask > Make. You've now added some simple texture lines to the hair.



5 Using the Direct Selection Tool, select the top-most hair shape (the one we used for the mask) and add a stroke around the edge using the same colour swatch as for the texture lines. This effect completes the seamless transition.



6 Repeat Steps 2 to 5 for the smaller portion of hair on the right side. You should now have a completed illustration of the smaller character.

Part 6: Fine details

Using small accents can have a big impact on your finished illustration...

Adding typography

When designing a composition that includes both type and characters, try to create a relationship between the two. If you know how much copy to expect before you start designing, all the better – you can plan for this in your composition during the sketch phase. Tie in your text even more with your characters by adding illustration aspects in or around your copy area. Have fun with it, but don't forget about your visual hierarchy. Ask yourself: "What do I want my audience to see first?"

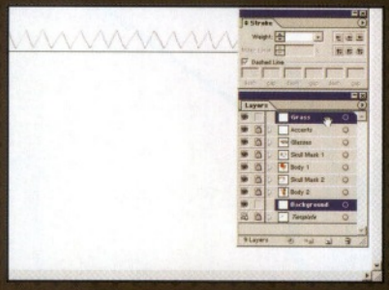
1 Create a new layer and name it Accents. Move this layer to the top of the stack. Begin drawing white highlights that suggest the shine on a round, glossy object. For now, just concentrate on placing the highlights.

2 Select all your highlights and change their opacity to 20 per cent in the Transparency dialog box. Try mixing up the opacity values until you achieve a look you're comfortable with. This completes the glossy effect.

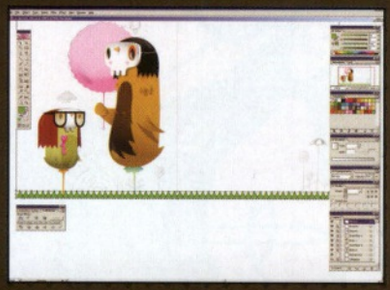
3 You can also add some interesting shadow accents by using a linear gradient (white to 30 per cent grey), and changing the blending mode to Multiply. The white disappears, and you're left with a smooth gradation from shadow to colour.

Part 7: Adding background touches

Set the stage for your characters with some bright elements and contrast...



1 Lock all your existing layers and create two new layers: Background and Grass. Locking the layers prevents you from accidentally adding elements to the wrong layer. Move the Background layer above your Template layer, and the Grass layer above your Accents layer.



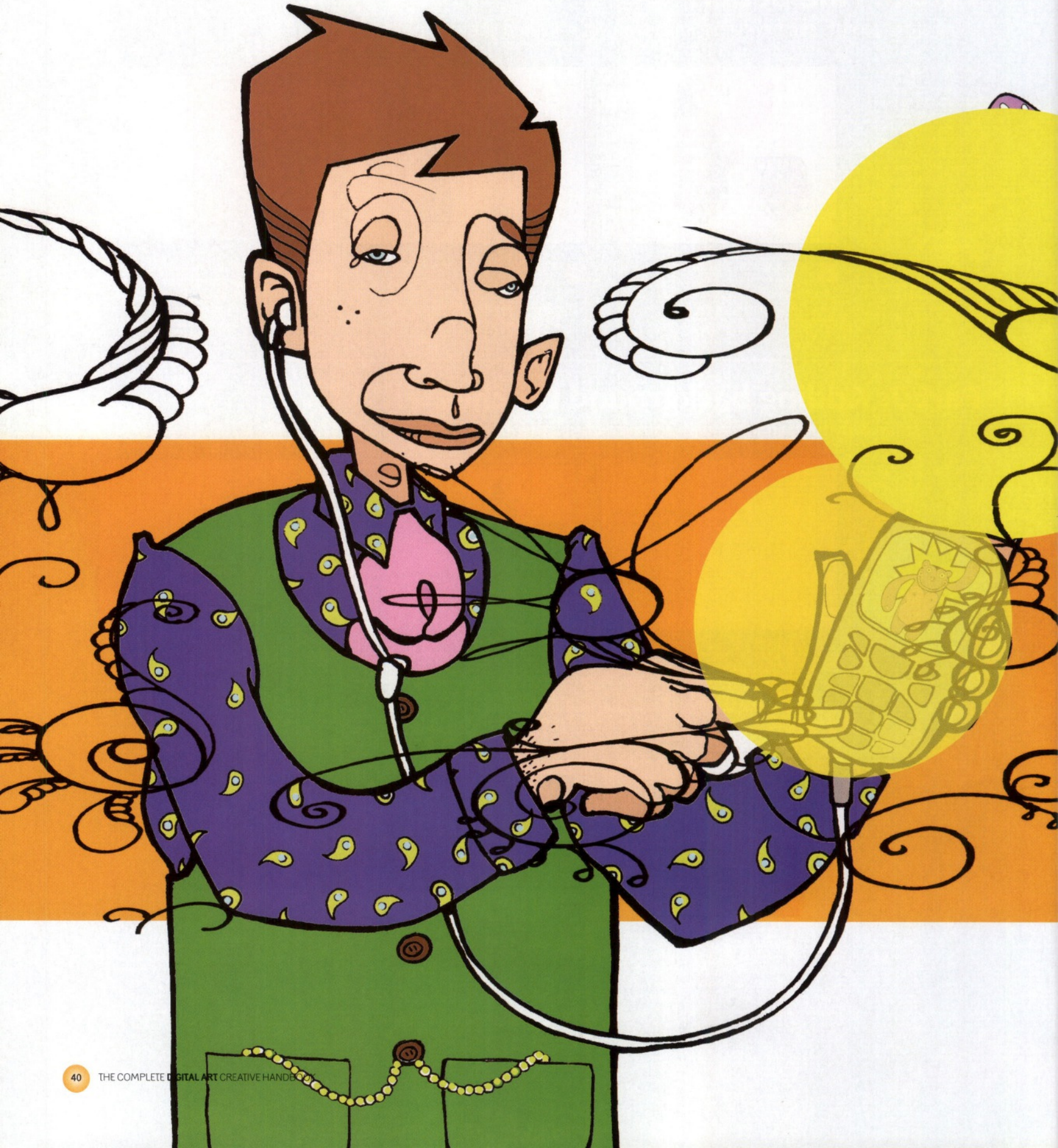
2 On the Grass layer create a triangle with the Polygon Tool. Hold Shift, and Alt/Option-drag the triangle to the right to duplicate the shape. Step and repeat the triangle until it fills the entire width. Select the row of triangles and select 'Add to shape area' in the Pathfinder palette.

3 Lock the Grass layer, and begin drawing the rest of the background elements included in the sketch. Feel free to add more (or less) to the composition as you see fit. Bear in mind that we're going for simplicity, to keep the focus on the two characters we've just drawn.

4 Fill the Background layer with a radial gradient in a dark colour. Reposition the gradient effect behind the rainbow with the Gradient Tool. For the sky, draw a rectangle across the document and fill it with a linear gradient from grey to white. Set the blending mode of this shape to Multiply.

5 Time for some background texture. Draw a tiny white square, and within this an even smaller circle. Fill it with 50 per cent black. Select both shapes and drag them into your Swatches palette. You now have a pattern swatch. Draw a rectangle and fill it with your pattern. Set it to Multiply, and reposition it to sit just above the background gradients.

6 Create a new layer named Sparkles. Draw some thin triangles, copy and rotate them, then combine them in the Pathfinder palette. Compose a bunch of smaller and larger sparkles to your liking. Select all your sparkle elements and go to Effects > Stylize > Outer Glow. Adjust your glow settings to Screen, 85 per cent Opacity and a 1.2mm Blur. ■



Tutorial

[illustration] Finn Neary, **[w]** www.yakahead.com

Character animation

Develop a sketch into a movie for HDTV or mobile phones

As a character animator, you sometimes have the luxury of being able to design your character from scratch, work out how it will be animated, produce the hundreds of drawings needed, and then compile them into a single production for a single medium.

More often – especially in these days of multiple formats, when video is cropping up everywhere from the internet to your mobile phone – characters often start in one format and need to be repurposed for others. A web character might be needed for a cinema advert; a character developed for print might need to be transferred to TV; a video mobile ringtone might be required for a pop video, and so on. In this tutorial, we show you how to take a character that starts life as a simple sketch, turn it into an illustration using *Illustrator* and *Photoshop*, then develop it further into an animation. The character needs to go through a range of movements, and be placed into several different scenes which will be cut together to tell a story.

The final version then needs to be produced for a range of formats. We'll output the animation as a video for HDTV and, at the other end of the scale, also produce it as a tiny file for playing back on mobile phones. In addition, we're going to produce a web version as a Macromedia *Flash* animation.

The rules of characterisation remain the same, but the different platforms need to be taken into account. For example, a 42-inch widescreen TV might be big enough to show the fine details of a character's expression, but a one-inch mobile-phone screen won't. Likewise, a video clip can have as many textures as you like, but a Flash animation will quickly become too large to download if you don't keep to flat areas of pure colour.

Expertise provided by freelance illustrator and journalist Christian Darkin. Darkin has produced images for newspapers, magazines and a mix of advertising agencies, websites and museums. Visit **www.darkin.demon.co.uk** for a few examples.

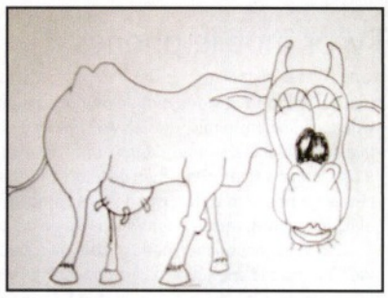
The finished animation can be found on the CD, in the Tutorial Files\Character Animation folder.

Part 1: Create your character

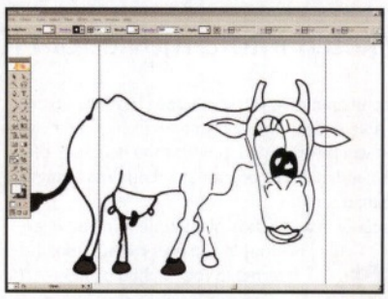
Produce a set of animal body parts to animate in *After Effects*...

Working with vectors

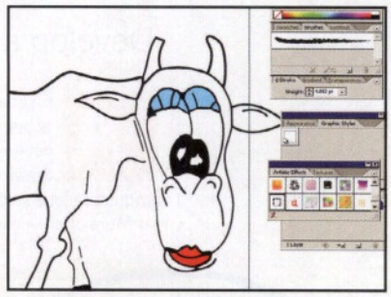
Converting to a vector image means that we can adjust any line on our character, and create new animation frames for facial expressions or other small movements. It also makes the image resolution-independent, so that our rough sketch becomes a drawing that can be blown up to full HDTV resolution and beyond.



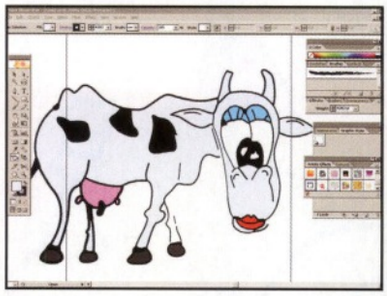
1 Our main character is based on a rough pen drawing. It's not the most impressive piece of artwork to begin with, and it's clearly not designed with animation in mind, so the first thing we need to do is tidy it up.



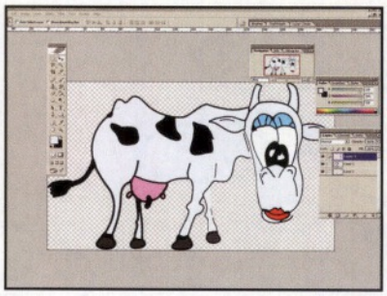
2 *Illustrator* is our starting point. We load our cow, and use the Live Trace tool to turn the original sketch into a set of paths. It takes a while to work out the right settings, and when the job's done, we can simplify the paths to create a more editable character.



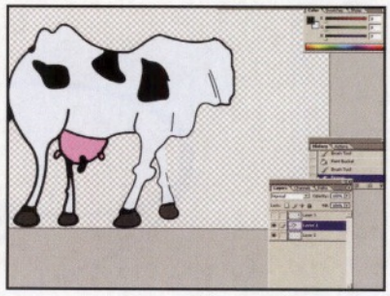
3 Next we fill in some colours in Live Paint. The original drawing was quite rough, so we need to use the Live Paint Gap Options tool to fill in colours reliably. Our cow may be black and white, but it's a cartoon rule that it has to have red lips and blue eye shadow.



4 To create distinctive patterns on the cow's back we produce some simple paths, and fill them. With this done, we can turn to *Photoshop* and begin to prepare the image for animation.

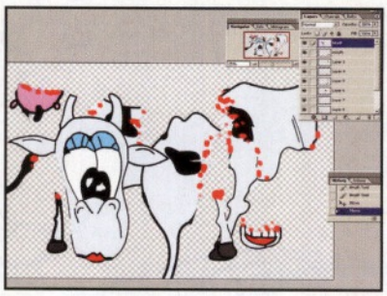


5 The cow is imported as a PNG file, which enables us to work with it as an image while retaining the background transparency. Most of the cow's animation will be pretty simple – we want it to chew the cud and blink its eyes. Using *Photoshop's* Selection tools we cut off its head and place it in a new layer.

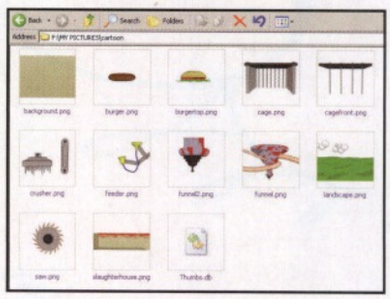


6 We carefully sew up the neck, so that when the head is placed back on it can be animated without leaving any gaps in the image. When we come to animate the cow, the two sections will be placed on separate layers within *After Effects*.

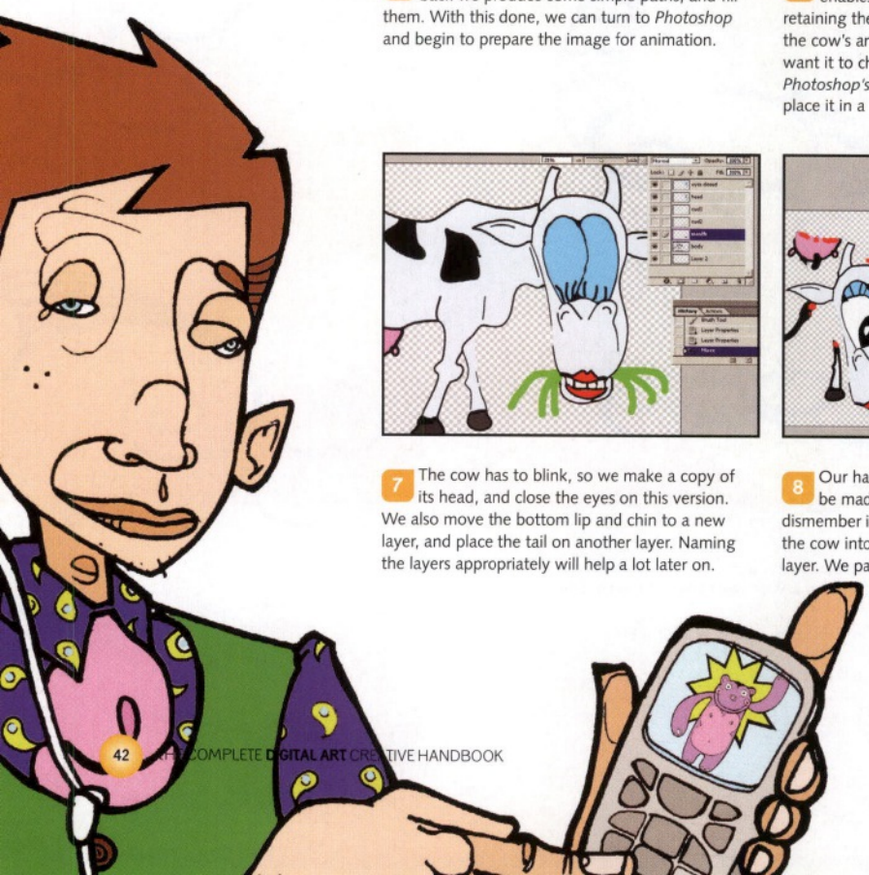
7 The cow has to blink, so we make a copy of its head, and close the eyes on this version. We also move the bottom lip and chin to a new layer, and place the tail on another layer. Naming the layers appropriately will help a lot later on.



8 Our hapless cow is eventually going to be made into beef burgers, so we need to dismember it. In a new *Photoshop* file we cut the cow into pieces, with each piece on a separate layer. We paint in a little blood for effect.



9 Finally, we need some other graphical elements for our animation. These we've prepared as separate drawings that have been saved as PNG files. It's worth storyboarding your animation thoroughly before you start, so you at least know what you're going to need in the way of graphics.

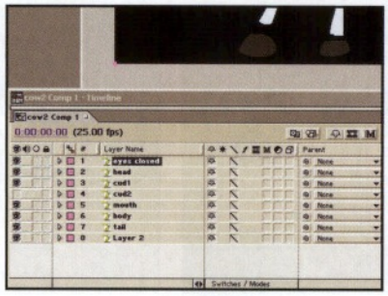


Part 2: Get things moving

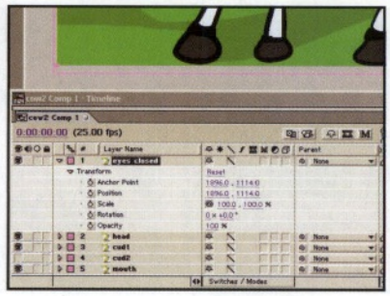
Open *After Effects* and begin to animate your character...

Photoshop layers

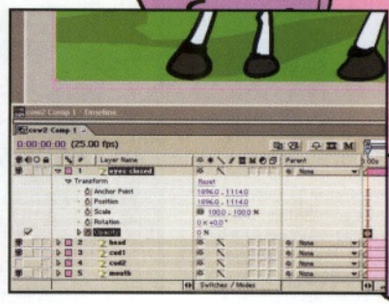
After Effects accepts *Photoshop* files as compositions, so what we're effectively doing here is creating layers that can be animated separately later. Cutting a character into body parts is much more useful than making layers out of fills and overlays, as you might do for a still image. Layer names will eventually appear on the *After Effects* timeline, so if they're clearly named they'll be much easier to work with.



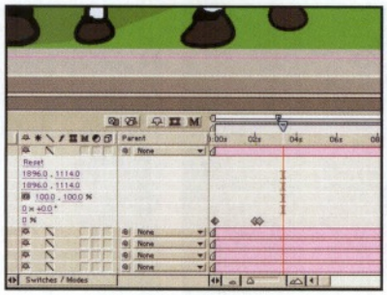
1 Our animation is being assembled in *After Effects*, so we begin by loading in all the elements for our first shot. It helps to work on one shot at a time, because too many elements can make things confusing. Our *Photoshop* document can be loaded in as a composition – with the layers preserved on the *After Effects* timeline.



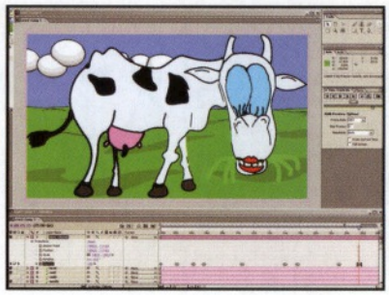
2 We also import the backdrop we're going to be using. This is a still image, and we can drop it on to the timeline behind the character and drag its corners to resize and place it. We're now ready to begin animating. By clicking the tiny arrow to the left of the 'eyes closed' layer on the timeline, we open the animatable functions of the layer.



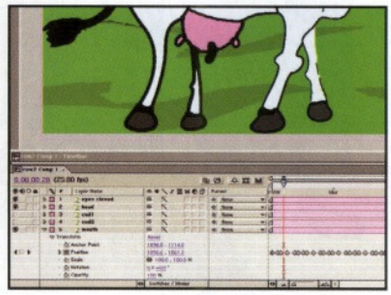
3 Making the cow blink is just a matter of animating the Opacity of this layer, so we click the stopwatch icon at the left of the Opacity label to turn on animation for that function, and reduce the value from 100 per cent to 0 per cent. Our first keyframe appears as a diamond on the timeline.



4 We now drag the playback head (the blue marker) a couple of seconds into the production, and click the checkbox at the very left of the timeline in the Opacity row. This adds a new keyframe. We move on a single frame, and set the opacity value to 100 per cent. A couple of frames later we add a 100 per cent keyframe, and then, one frame on, we set the value back to 0 per cent.



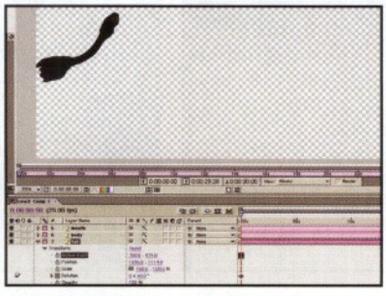
5 Now when we play through the animation, using the time controls at the right of the screen, we can see the cow blinking. Keyframes can be copied and pasted, so we just select them, move the playback head a little, and paste in a few more blinks.



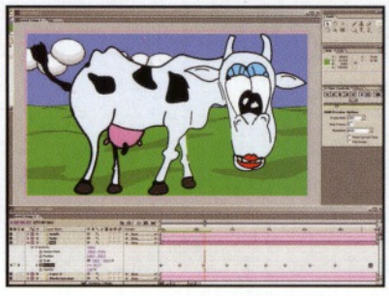
6 Next we open up the mouth layer. Instead of activating animation for the Opacity function, we click the stopwatch next to the Position label. We place the jaw simply by dragging it on the composition window to open and close the mouth. We place keyframes every half second throughout the animation so that the mouth chews constantly.

Copying keyframes

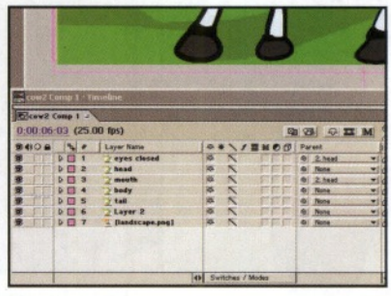
Copying and pasting keyframes works here because the eyes return to their open state after each blink. If you copy keyframes where animations aren't loopable (for example, movement keyframes, where the object doesn't return to its original position), you may get undesirable effects.



7 To animate the tail, we turn on rotational animation, but there's a problem. Rotation occurs about an anchor point at the centre of our picture. We want the tail to rotate about its base: the cow's backside. By double-clicking on the layer, we open it in the composition window, and we can drag the cross representing the anchor point to the correct position.



8 When we click on the tab at the top of the composition window to return to a view of the timeline, we can reposition the tail. It's now possible to rotate it properly, and we can add keyframes to keep the tail wagging throughout the animation.



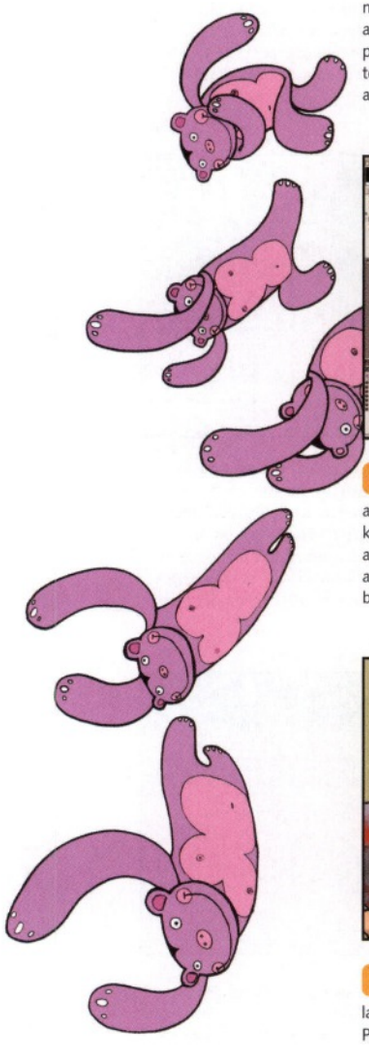
9 We now want to animate the head. This is going to be a little more difficult, because the blinking eyes and the movement of the mouth are all related to it. In the Parent column of the timeline, we change the setting for both the eyes closed and mouth layers from None to Head. This makes the head layer into the parent for the other layers.

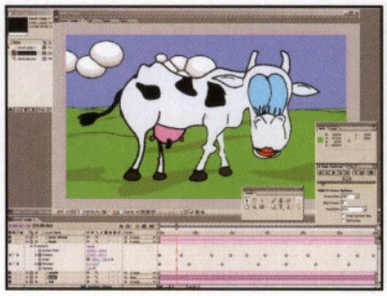
Part 3: Fast food

Prepare your hapless character for a tasty ending...

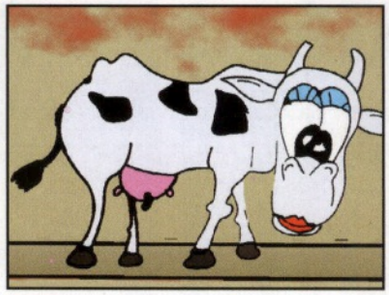
Blade keyframes

The blades which will eventually make mincemeat out of our bovine friend are off-screen at the start of the animation, so it will be difficult to set keyframes for them. However, you can turn on animation for a function at any point on the timeline, and the first keyframe will be placed there, so place your first keyframe where the blades will end up, and work backwards.



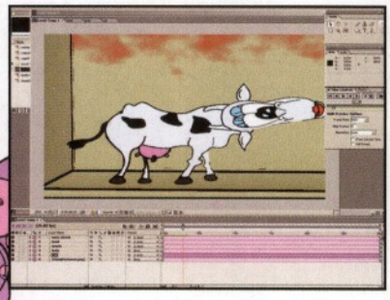


1 When we animate both the position and rotation of the cow's head, the mouth keeps moving, but stays attached, and the eyes blink just as they did before. Parenting is an extremely powerful tool. We also parent the head and tail to the body, then shrink the cow and position her a little better within the frame.



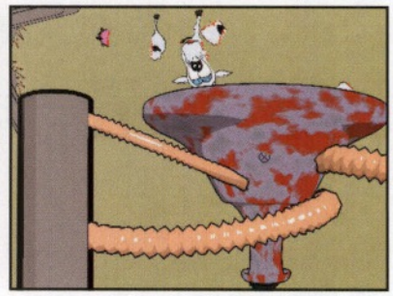
2 One of the most important types of motion in cartoon animation is squash and stretch behaviour. In our next scene, the cow falls into a new environment. We simply delete the background, save the file under a new name, and introduce a new backdrop. This preserves all the animation we've already added, so our cow continues to move, chew and blink as before.

3 A couple of position keyframes on the body are all that's needed to drop the cow into place at the beginning of the scene. We also add a head rotation animation at the beginning so the cow's head starts by facing upward, and is then brought sharply back into position a frame after the cow hits the ground (as though it's shaken by the force).

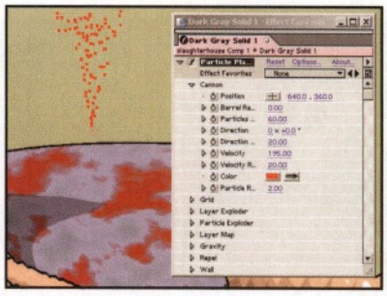


4 With the body layer's pivot placed at the bottom of the hoof, we open the layer on the timeline and turn on animation for scale. We place some keyframes: one with the creature's vertical scale at full as it hits the ground, one a fraction of a second later at about 60 per cent, and another a few frames on, back at full scale again. The bounce adds comic effect.

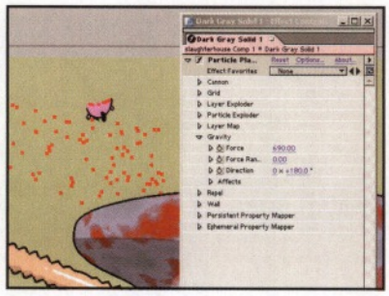
5 We create the impression that the cow is on a conveyer belt by making the background slide. It's a simple two-keyframe job, because we've ensured that the background is far longer than the frame it's placed into. The rotating blades are done quite simply, using a couple of layers parented to each other and to the backdrop.



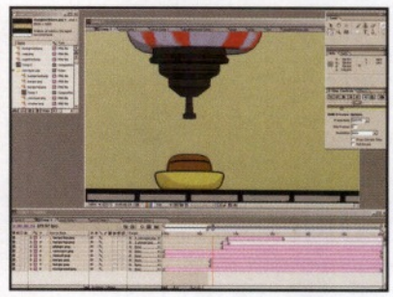
6 As the cow is about to hit the blades, we tastefully cut to the blood-soaked pieces flying out the other side. Here, we've started a new composition with our second *Photoshop* file. The pieces of cow are animated separately using position and rotation keyframes.



7 We create a particle system to add a gruesome spurt of blood. We do this by adding a solid layer, and selecting Effect > Simulation > Particle Playground. The particle system is basically a spray of objects which can be image layers in themselves, but in this case we've chosen to use crude red dots.

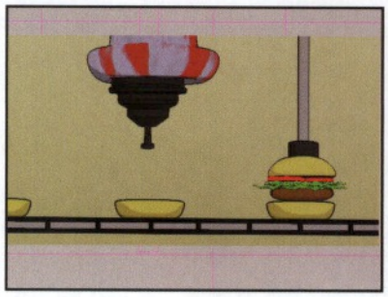


8 The particle system is twisted through 90 degrees, and we animate its rate of flow to turn it on and then off again. Particles have gravity and velocity by default, but we can play with these two controls to ensure that all the blood lands in the funnel.

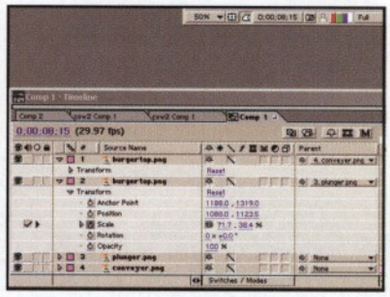


9 Finally, we create a new shot containing just the end of the funnel and a conveyor belt beneath. It's not just the main characters in an animation that need to have personalities – here, the character of the burger machine is vital in preserving interest after the main focus of the story has been minced. The machine displays its personality by making the viewer wait, then starting to shake, and finally by delivering one shot of pulped cow on to a bun.

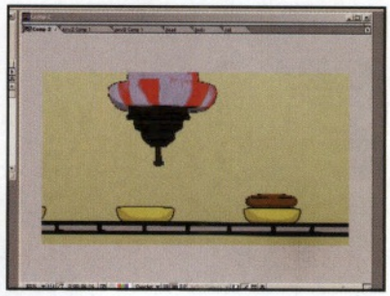
Fast food, continued



10 The final punchline is delivered by a robot arm flipping down to top off the burger. Again we use squash and stretch animations on the burger, but this time parenting causes problems – the top of the burger must move in the first instance with the arm, and then with the burger along the conveyer belt.



11 The solution is to create two burger-top layers. The first is parented to the arm, and finishes the moment it hits the burger. The second is parented to the rest of the burger, and begins at the same frame.



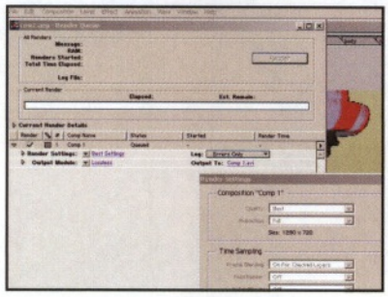
12 We now create a new composition, and import our previous scenes into it. Then, we cut together our scenes into a finished animation. If we were being really ambitious, we could also add sound effects.

Part 4: Outputting your cartoon

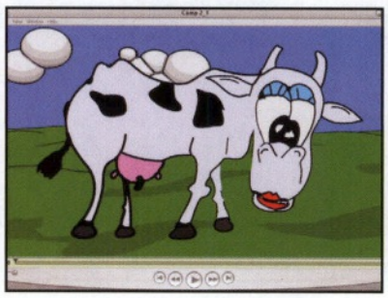
Finally, we show you how to complete your animation for different platforms…

The right aspect ratio

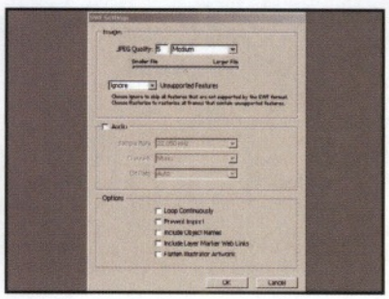
If you're building an animation for a range of formats, you might find aspect ratio is a problem. Widescreen TV is a different shape to normal TV, a cinema screen is wider again, and mobile phone screens can be landscape, portrait, or square. Decide whether you want your image stretched or clipped, or whether you want to recompose it entirely for each new medium.



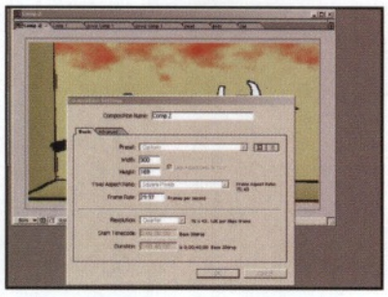
1 All our compositions were done at the highest resolution we're planning for the movie (HD video – 1280x720) so we can output the HD file relatively easily. By selecting Edit > Add To Render Queue and ensuring that the render settings are set to Best Settings, we can produce our movie.



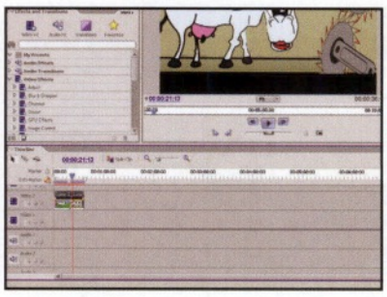
2 We use the output module to set up the movie's format. We've chosen QuickTime, but many animators would output the production as a series of uncompressed still frames. The rendering of our 36-second piece takes around 45 minutes.



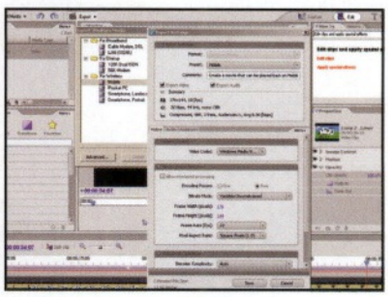
3 You can export *After Effects* compositions as Flash animations with File/Export/SWF, but the exporter is fairly primitive and you don't have much control over the size and features of the file. You get more control by exporting scenes individually, then re-importing them for the final edit.



4 You can then create a low-resolution composition in which to composite your Flash files into a single movie for export. If you've got a package which works specifically with *Flash*, you may want to open the files in that to refine your Flash movie.



5 *After Effects 6* can't directly export the MPEG-4 files played by mobile phones. However, many editing packages can, including *Pinnacle Studio* and Adobe *Premiere Elements 2*. Here, we've loaded our high-resolution HDTV file into *Elements 2*, and placed it on the timeline.



6 You can export the animation in a couple of different formats for mobiles, and even adjust the settings to suit your content. Within *Premiere* you can also adapt the content for other devices, such as video iPods or PSPs. Phone screens are generally limited to 176x144 pixels, so the level of detail will be low. ■

[illustration] Clusta [w] www.clusta.com

Tutorial

Animate your vector artwork

Use *Illustrator CS2* and *Flash* to turn your vector illustrations into an animation for the web...

Not everyone likes them, but a website's intro animation can set the tone and also be a fantastic showcase – especially if the site is a web-based art gallery like Graduart.

Graduart focuses on the work of students, graduates and post-graduates, and Clusta helped develop the brand for the online gallery from day one. Clusta began by designing the logo, followed by the graphical element, which you'll see represented in this tutorial. The brief for this project was simply to be organic, cool and flowing.

This tutorial demonstrates how Clusta combined different programs and techniques to achieve the transformation from static design for print to animation for the web. View the finished animation at [w] www.grad-u-art.com.

Expertise provided by Clusta, which has worked for companies such as Sony, Orange and the BBC across a diverse range of media including websites, intranets, extranets, e-flyers, CDs, videos and print. See more at [w] www.clusta.com.

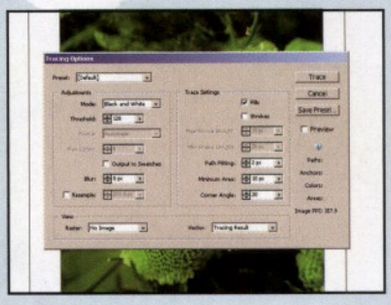
Part 1: Creating the elements

First, you need to use *Illustrator CS2* to convert all your photographic elements into vectors...

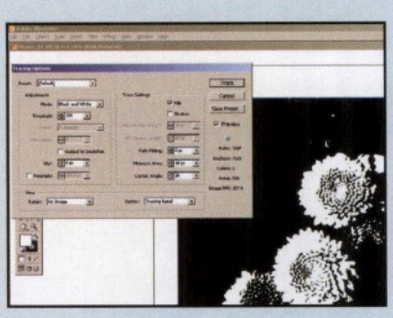
Plan your attack

When you're starting a project, always have the aim clear in your mind. Make sure you've worked out answers to basic questions that may cause problems if left too late in the process, such as how fast the pace should be, or what music should be used. Always keep the brief clear in you head, and carefully choose the elements that make up your design.

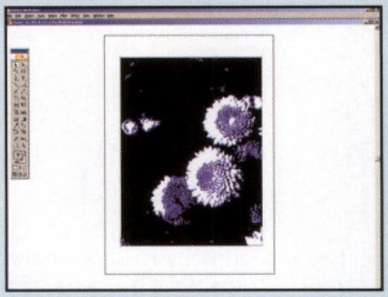
1 In *Illustrator CS2* click File > Import, and browse to the images you want to use in your project – we're using a JPEG of flowers. Select your file and click Open. Then click either of the two Selection tools on the main toolbar, and click on the image to select it. To convert this image to vector, click Object > Live Trace > Tracing Options.



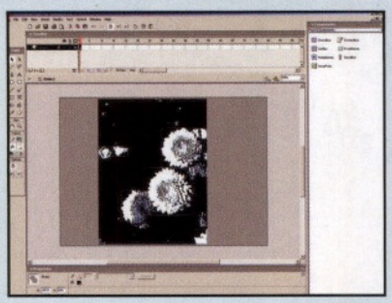
2 The options look daunting, but they're quite straightforward. Click Present, and a drop-down menu will appear showing the trace styles you can apply. Select Detailed Illustration. The Threshold option enables you to change the contrast of your trace depending on the brightness/darkness of your image. Click Preview to preview the image.



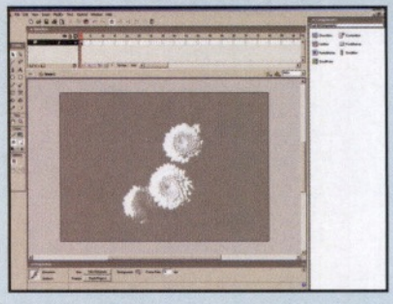
3 Move the Trace Options dialog to one side and you'll see that the image's appearance has changed to a black-and-white silhouette. Adjust the Presets/Threshold until you achieve the desired effect. Click Trace to confirm the settings.



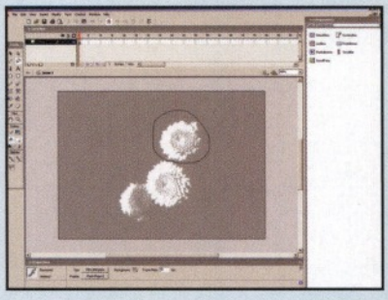
4 Click Object > Live Trace > Expand As Viewed. You should now see the image converted into separate vector elements, and it's ready to export to *Flash* for final prepping. Click Files > Export, create a new folder called Converted Elements and save the file as an SWF (default setting), making it a *Flash* movie. Repeat these first four steps for all the elements that will make up your animation.



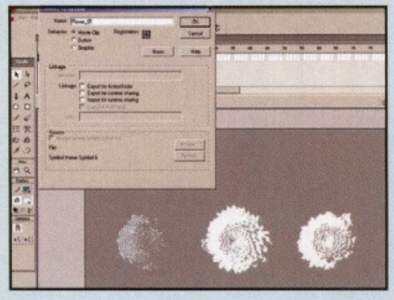
5 Open *Flash*, and towards the foot of the screen you'll see a background colour option. Change this to a mid-grey (the reason for this will become apparent later). Click File > Import, and select your SWF. Click Open. The elements that aren't needed must be edited out. Select all of the image and you'll notice that it's broken down into lots of little symbols, making it easy for you to move or delete areas.



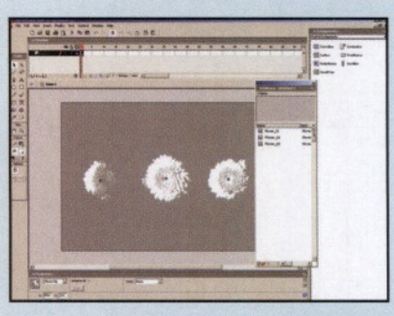
6 With the Arrow tool selected click on and delete the background. Then delete everything else until you're left with just your main elements (in our case the three flowers). Go to Edit > Select All, then Modify > Breakapart. This enables you to remove the black areas while retaining transparent shapes, such as in the white areas of the flowers.



7 Carefully select each element (in this case each flower). Use the Lasso tool to draw around the shape, and the item within will be selected. Separate the different elements.



8 With the elements selected, click Insert > Convert to Symbol. Here an object can be converted to a movie, button or graphic symbol so it can be stored in the Movies Library to animate later. Enter the name (for example Flower_01) and under Behaviour click on Movie Clip. Repeat the process for each element.



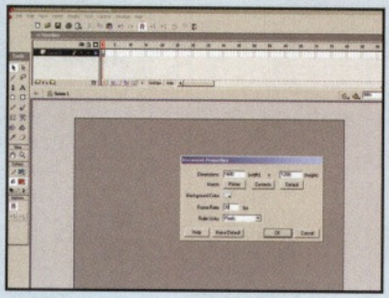
9 Once your elements have been converted to movies, click Window > Library. The three symbols should be stored for later use. Delete the three symbols from the main stage and click File > Save, and save the movie as Main Animation in a new folder called Animation. You now know how to covert to vector and prep for animation, so repeat the process for the rest of your design elements.

Part 2: Layout and animation

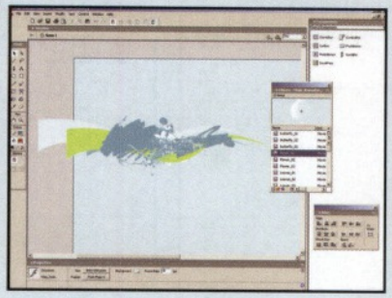
Prepare the *Flash* movie for the web, and lay out all the graphic elements ready for animation...

Avoid complications

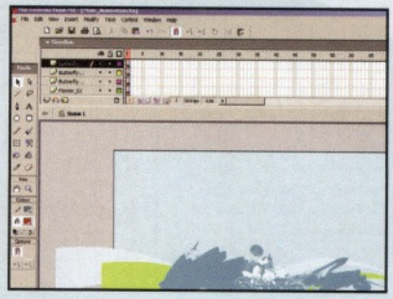
Flash is first and foremost a web design tool, but it's also very useful for constructing static illustrations. Remember to keep your *Flash* library and layers tidy. Not naming them properly is only going to cause problems further down the line – if it comes to animating 300 symbols that you can't find, things are going to get very stressful.



1 With your *Flash* file open, click Modify > Document, then select Dimensions. The standard should be to accommodate for 600x800, but this is a huge 1,200x1,600. Choose Background colours. Change your Frame Rate to 30fps to allow your animation to run smoother than the standard 12fps (try it and see the difference).Click OK.



2 Now you can start laying the graphical elements out on your stage. Open your Library (F11), select all the items in the Library (hold Shift then click on the top and bottom items) and drag and drop the items on to the stage. You should see all the items bunched up in the middle.

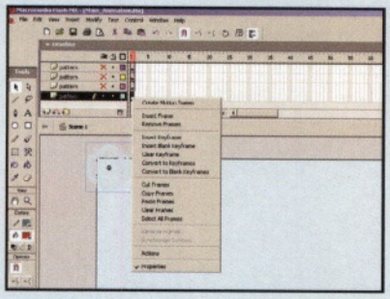


3 With all the items selected move your cursor over them and right-click (Windows) or Ctrl-click (Mac) to select Distribute To Layers. If you look at the timeline at the top-left, you'll see that each stage item is now in a layer of its own – this will help you with depth arrangement for the layout and animation.

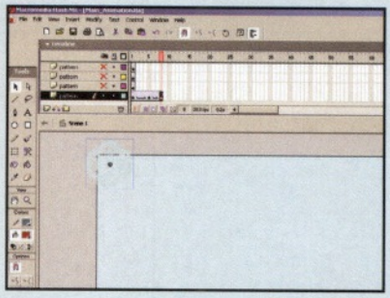
Client content

All navigation and client content has been removed from the design in this tutorial. Visit the site at **[w]** www.grad-u-art.com to see the finished animation in all its glory.

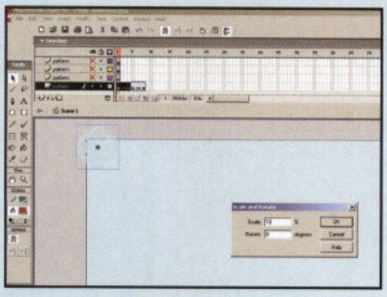
4 Now all you need to do is get your design together. (We'll let you work this part out for yourself!) Once the finished design is laid out, you need to work backwards to build up the animation.



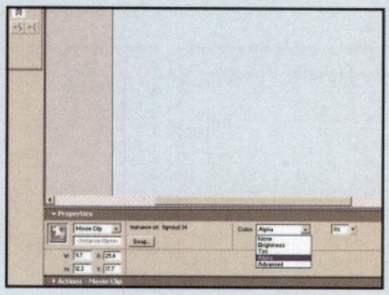
5 Click the Eye symbol just under the timeline to turn off all layers except the one you want to work on. On the appropriate layer's first frame, right-click/Ctrl-click to select Create Motion Tween, and deselect the frame. Notice that the frame has turned blue to indicate a Tweening action (animation action).



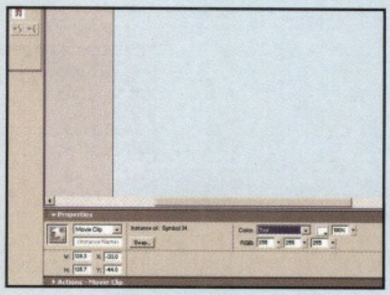
6 Select the Tweened frame again, and right-click/Ctrl-click to select Copy Frames, then on frame 5 of the timeline right-click/Ctrl-click to select Paste Frame. Do the same on frame 8.



7 We want our symbol animation to start off completely transparent, and appear to scale up and become visible. To do this we select the timeline frame 1, and select the symbol on the stage. We click Modify > Transform > Transform and Scale: change Scale to 10 per cent, and leave Rotate empty. The symbol should now appear smaller on the stage.



8 With the symbol still selected, we click Windows > Properties. We then click the Color menu in the middle of the bar and select Alpha, and reduce the slider bar on the right to 0 per cent.

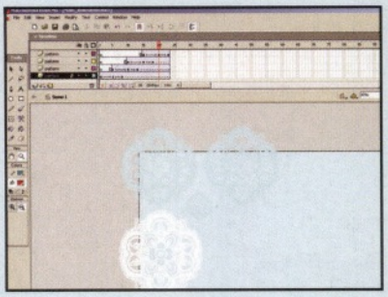


9 We now go to frame 5, and select the symbol on the stage. We click Properties, then click the Color menu and select Tint, and change the colour window to 100 per cent white. The symbol also needs to be scaled at this frame in order to give it a slight bounce. To do this we repeat the Transform and Scale process as in Step 7, this time increasing Scale to 110 per cent.

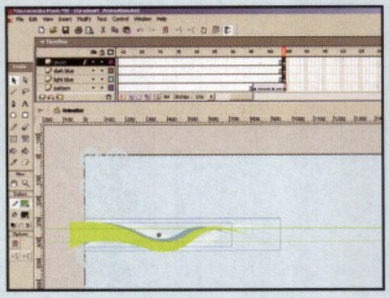
Layout and animation continued...

Keep the flow

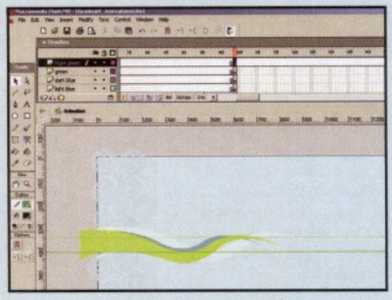
If your animation starts to look a little unrealistic in terms of its flow then have a play around with the Tweening Ease. You can inject a lot of natural movement, and even gravity, into your work just by tweaking the slide bar up or down (see Step 13).



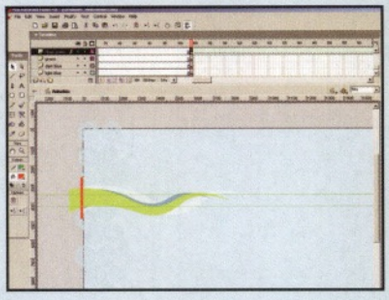
10 In the timeline there's a red bar – we can move this over frames 1 to 8 to see the symbol animate. We can now apply steps 6 to 9 to the other symbols in this sequence, staggering the layers over five frames. (When you're doing this remember to extend the frames on the lower layer to the length of the final layer in the sequence.)



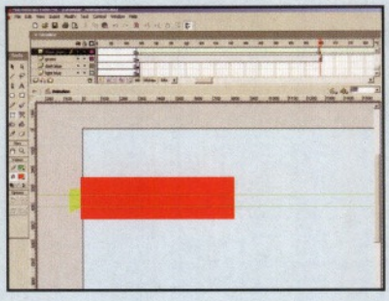
11 The next symbols to be animated need to be masked to create the impression that they gradually flow across the screen. To do this we go to the beginning of the timeline and select the first frames of the three layers, and drag the frames along the timeline to meet the end of the last sequence.



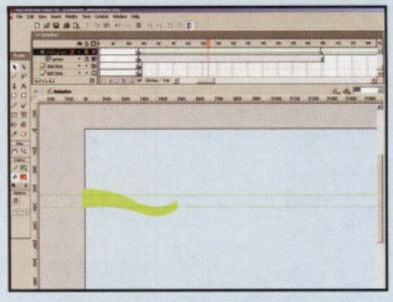
12 We highlight the layer named 'green', click Insert > Layer, and name the layer 'Mask green'. On frame 104 of this layer we right-click/Ctrl-click to select Insert Keyframe.



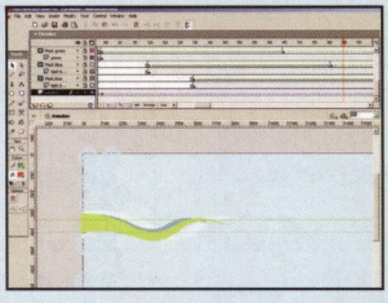
13 We select the Rectangle tool, and just to the left-hand edge of the stage draw a rectangle (making sure it's slightly taller than the symbol we're about to mask it with). With the same frame highlighted, we go to Properties and click Tween > Motion, then move the Ease bar to 100 Out (this allows the animation to start fast and gradually slow down to stop).



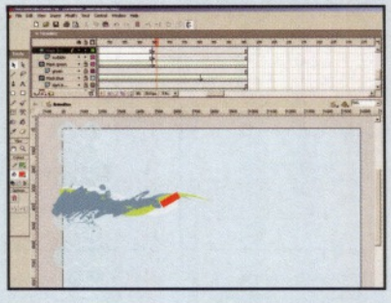
14 We insert a keyframe at frame 165 of the 'Mask green' layer. We also extend the frames on the 'green' layer to the same length using Insert Frames. Now the red rectangle on frame 165 needs to be the same length as the symbol on the 'green' layer, so we use the Transform tool on the main toolbar to resize the rectangle to the required length. As we drag the red bar in the timeline over these frames, the rectangle grows.



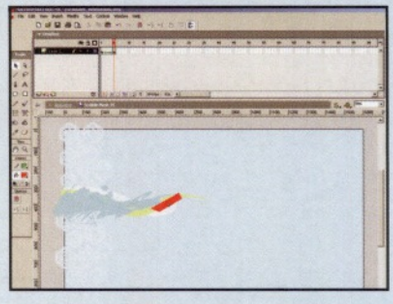
15 We right-click on the 'Mask green' layer and click Mask: both layers will now appear locked, with green symbols to the left of them. This means they're part of a masking action – if we move the red bar over the animation again, you'll see that the red rectangle has disappeared, and is acting as a mask for the layer below, giving the impression of growth. (To edit the symbols in your own animation simply unlock the layers.)



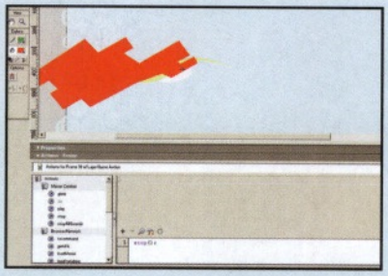
16 Repeat the masking process for your other symbols, staggering the animation over 15 frames to add to the dynamic of the animation.



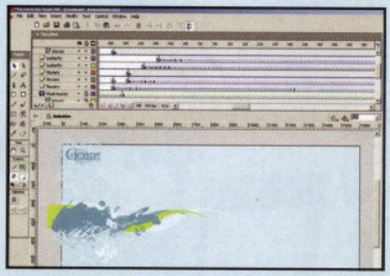
17 The next part of the sequence involves masking with multiple different tweens. We drag the first frame of our Scribble layer to frame 165, add a Mask layer to it, create a rectangle on that layer and convert to a symbol movie called Scribble Mask_01.



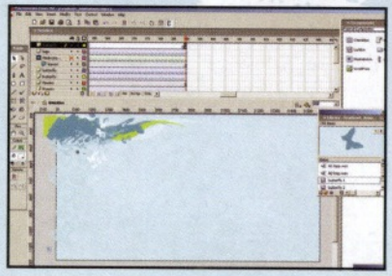
18 After unlocking the layers, we double-click on the Scribble Mask_01 symbol on frame 165. We're now inside the symbol, and can make our multiple Tweening layers act as one mask. Using the Tween > Motion action from Step 13, we animate the rectangle to cover the bottom corner of the scribble symbol.



19 We create a new layer, and repeat the process in the opposite direction, continuing until the scribble symbol is completely covered. Now we add a Stop action so the animation doesn't loop throughout the movie. We insert a new layer, and at the final frame select Insert Keyframe, and right-click/Ctrl-click to select Actions. The Actions tag opens below the stage. In the script box in the centre we type 'stop();' and press Enter. The letter 'a' in the keyframe indicates our action. We can move the red bar over the timeline to see it animate over the scribble.



20 From this point on, we need to animate the other elements using techniques we've already covered (from Masking to Tweening). Make an effort to keep your own animation consistent and the flow smooth, getting you back to the design you laid out in step 4.



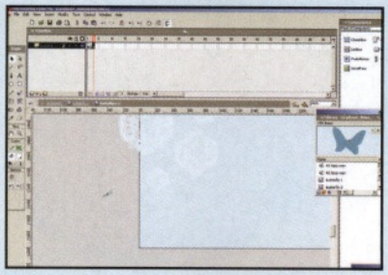
21 All we need to do now is add a finishing touch: in our case, winding butterflies. We insert a new layer with a keyframe at the final frame, and add a Stop action. We then drag our butterfly symbol from the Library on to the stage.

Part 3: Final animated features

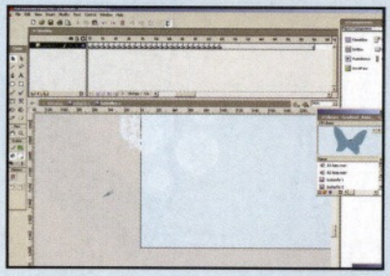
Complete your web animation by adding other moving elements...

Don't give your processor problems

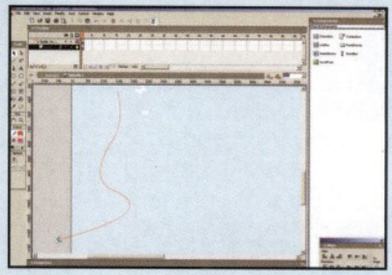
Try not to have a lot of animation running over the same time, all bunched up together. This will only cause your computer to struggle, and your animation will appear slow and ponderous.



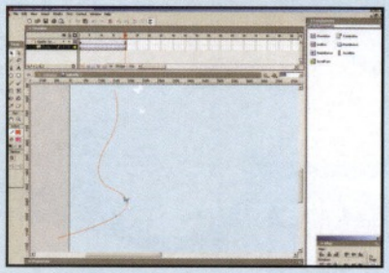
1 We double-click the butterfly symbol, select the butterfly and convert it to another movie called butterfly 2. We then double-click until we're within that symbol. We need to make the wings appear to flap, so on frame 3 we insert a keyframe and select the butterfly on the stage. We use the Transform tool to scale the butterfly, but only width-wise, so the butterfly becomes narrower.



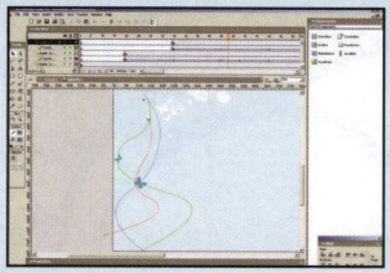
2 We add an extra frame to the timeline, select all the frames and select Copy Frames. At the end of the frames we select Paste Frames in order to repeat the process, and keep repeating for around 125 frames. We copy and paste the first frame, and extend for 30 frames.



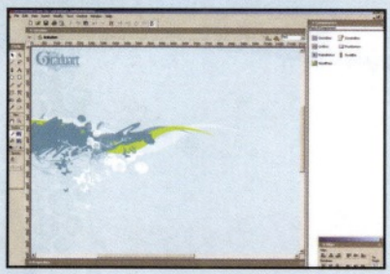
3 We go back to the butterfly 1 symbol so we can animate its flight path. We select Layer > Add Motion Guide. *Flash* adds a new layer dedicated to motion paths. In frame 1 of the guide layer we use the Pen tool to draw a swirly line to represent the journey that our butterfly will take over the distance of the animation.



4 We select the butterfly, and right-click/Ctrl-click to select Create Motion Tweening. At frame 20 we insert a keyframe, and move the butterfly to the first bend of our guide path (rotating it very slightly at the end). We repeat the process until the butterfly reaches the end point of the guide. We can move the red bar along the timeline to see the animation.



5 We can now apply the same techniques to our other two butterflies, staggering the frames and adding a Stop frame at the end. We now return to the lower level timeline.



6 Don't forget to add a Stop action at the last frame of your animation. You can then go to Control > Test Movie, sit back and watch your animation play. Alternatively, go to File > Publish Preview > HTML, and watch it in your browser. ■

Tutorial

[illustration] Fwis Design, [w] www.fwis.com

Design and build a flatpack toy

Use one of your favourite character designs to create a flatpack toy that you can give to friends and clients

Despite the fact that vinyl toys have been exceedingly popular for the last five years, it's a market that most illustrators and designers find it difficult to break into. Waiting around for Kidrobot or Toy2R to knock on your door isn't going to get you anywhere, so it's time you took matters into your own hands.

This tutorial demonstrates how you can take a sketched character design and turn it into a toy, which can then be built and given out for as long as you can afford the paper. All you need is Adobe *Illustrator*, some rudimentary drawing skills, an inkjet printer, some double-sided tape and a scalpel.

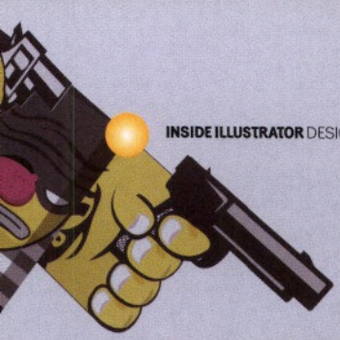
We'll start with a basic character design, and alter the shape to better suit the needs of the medium. No one likes making a lot of folds, and only die-hards enjoy spending more than ten minutes on arts and crafts projects, so keeping your shape as simple as possible is a good idea. You need to decide which features of your character should be accentuated, and base your design around these.

Next, we show you how to take that basic shape and turn it into a flattened template. You then apply final art to your template, and spruce it up with shading and extra bits of character to give it a more three-dimensional feel.

After that it's just a matter of making the template dummy-proof by adding dotted lines to the designated folds, tabs to the right areas, and instructions to key areas of the canvas which might otherwise cause confusion. Then you can print the character out, put it together, and show it off to all your mates. >

Expertise provided by Ben Pieratt. Ben is a partner at Fwis Design, which has offices in Denver, Colorado, and Portland, Oregon. See more of the company's creations at [w] www.fwis.com.

You'll find a PDF of the flatpack toy designed in this tutorial on the CD, in the Tutorial Files\Design and build a flatpack toy folder. Print it out, fold it up, and then create a toy of your own with the help of the following tutorial.

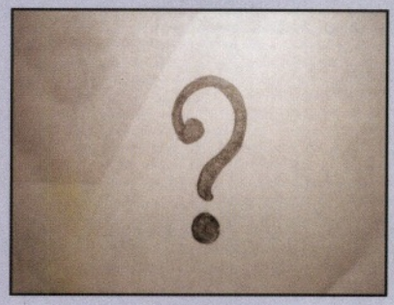


Part 1: Coming up with a character

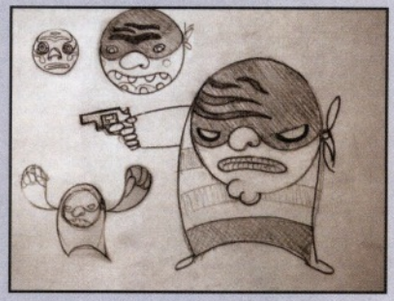
Create a character, or use an existing one, to get your toy design under way…

Keep it simple

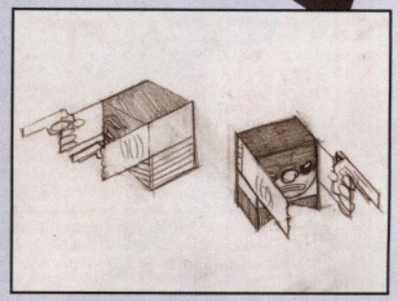
Remember, simplicity is key – if there are too many folds, people trying to put the toy together will get frustrated. You need to break your character down to the bare-bone essentials to keep your template painless.



1 You need to have a character design in mind to get you started, so spend a couple minutes, or hours, comping together something memorable. Alternatively, you can base your toy on a character that you've already created.



2 Here, we've sketched out a comic bank robber. Paper models need to be kept simple, so that they're easy to build. This means that, as when you're drawing a caricature, you need to determine the most prominent features of your figure.



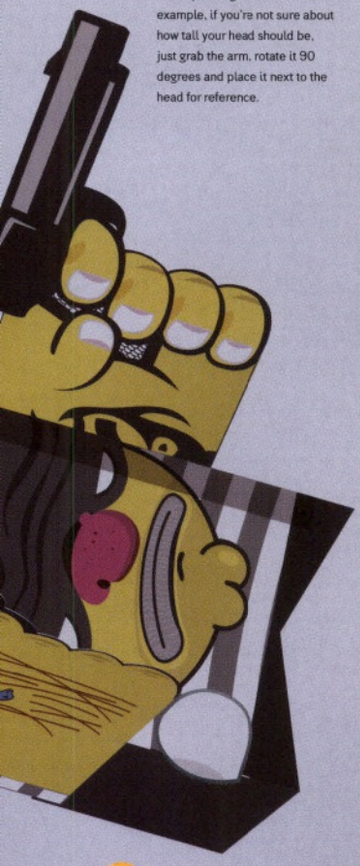
3 Now you need to turn your sketch into a three-dimensional shape. Start drawing boxes and flat shapes together to work out how your character will look – we're going to emphasise our character's arms and face.

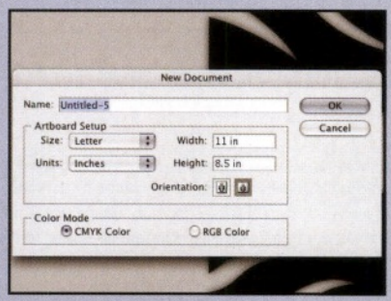
Part 2: Flattening your figure

Work out how to turn your 3D character into a flat shape…

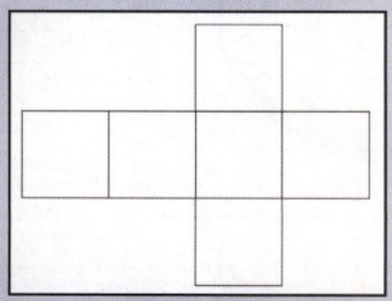
Perfect perspective

The easiest way to get your measurements perfect is to simply copy and paste corresponding elements. So, for example, if you're not sure about how tall your head should be, just grab the arm, rotate it 90 degrees and place it next to the head for reference.

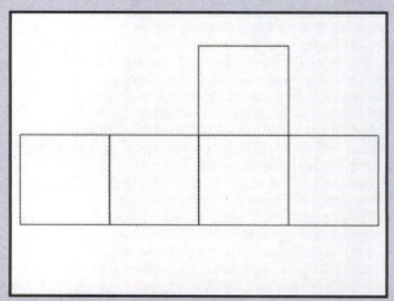




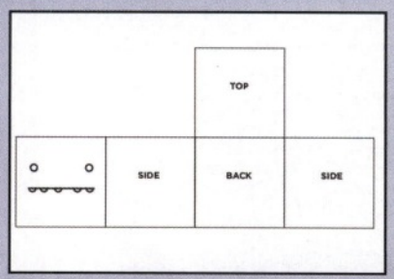
1 Once you've decided on a shape you'll need to figure out how that shape will lay flat. This is the hardest part of the process. It helps to think of everything in terms of a flattened box. Go into *Illustrator* and create a new standard-paper-sized, landscape document.



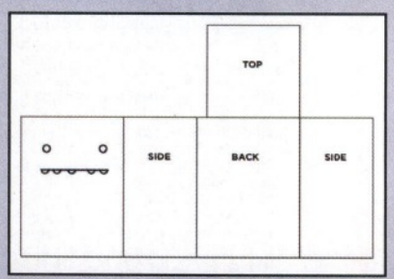
2 Now you need to make a simple box diagram like this one in a new layer named OUTLINE. Use the Rectangle Tool to create a perfect square by holding down Shift+Alt/Option while dragging, then duplicate this shape six times by holding down Alt/Option while dragging it.



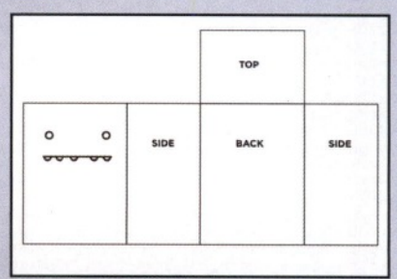
3 This character won't need a bottom because it's going to sit flat on the surface. If this is also the case for your character, get rid of the bottom by deleting the bottom square.



4 You can put placeholder text and images in the corresponding squares to help you keep track of what's what. Here, we put a face on the front panel, and text on the other sides.

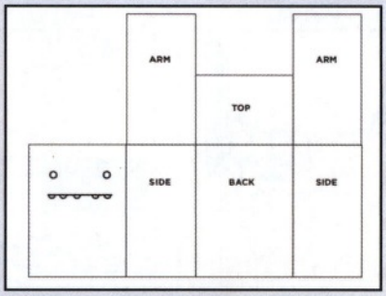


5 You'll want to alter the size of the squares to better reflect the shape of your character. Here, we make the torso wider, the whole body taller, and the sides a bit more shallow.

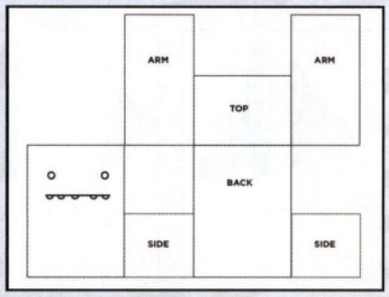


6 Make sure that opposite sides correspond in height and width. This means that the width of your sides needs to be the same as the height of the top square.

Flattening your figure, continued

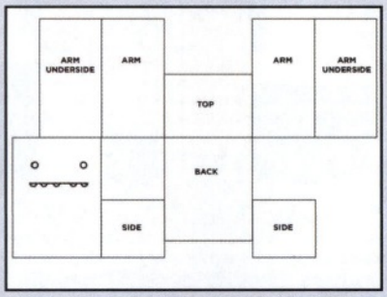


7 If you put arms on either side of the figure's head they'll stick straight out when the top is folded down. These arms may look way too long, but you need to bear in mind that once the template has been folded together the only parts of the arms that will stick out are the areas that extend past the front of the torso.

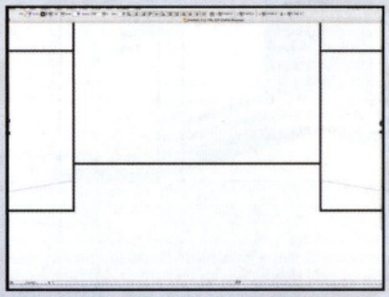


8 An area equal to the width of the arms should be removed from the sides of the box, so that the arms won't overlap other paper.

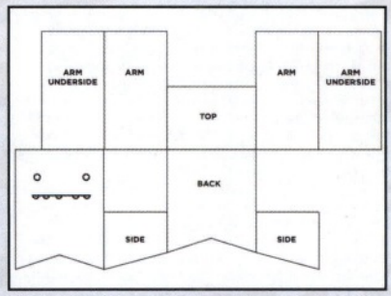
9 You don't want the insides of the arms to be blank paper, so add a duplicate arm to each side that can be folded underneath.



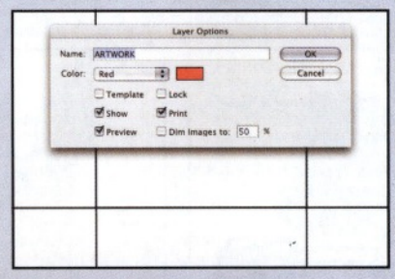
10 The long arms would make the character too front-heavy, and it would topple forward, so we're going to make the character sit back on his haunches a little to balance it out. We do this by first shortening his back.



11 Now we need to drag the innermost points of each side so that they align with the bottom edge of the back and the bottom edge of the front. The easiest way to do this is to select both points with the Direct Selection Tool and drag them upwards – this ensures that the two points line up on either side.

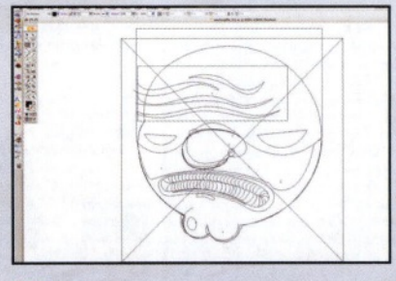


12 We want our character to have simple legs, so we cut out a triangle from the front and back. Abstracting the legs in this way enables you to keep the cuts simple, and emphasise the more important aspects of the illustration.

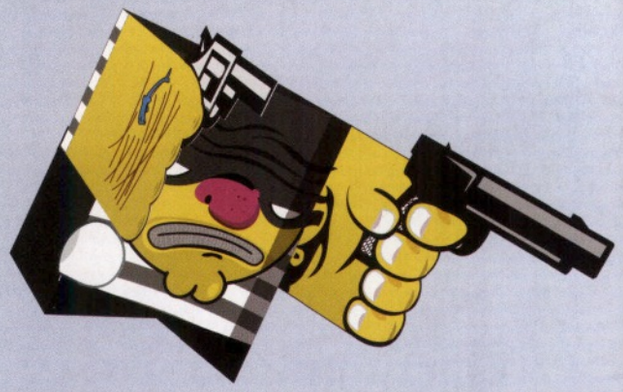


13 At this point you'll want to illustrate the various elements of your character, and apply them to their corresponding spots on the template. It helps to keep your template unaltered to start with, so create a new layer underneath called ARTWORK, and lock the OUTLINE layer.

14 The next step is to scan in the sketches of the character you want to use, and then import them into *Illustrator*.

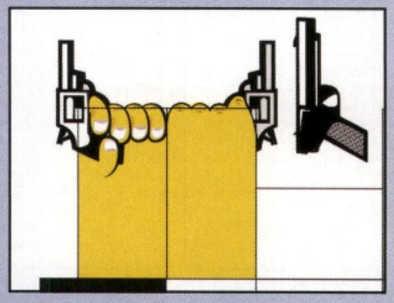


15 We traced the robber's face outside the artboard, made some changes to it, and then placed it on the corresponding area of the template.

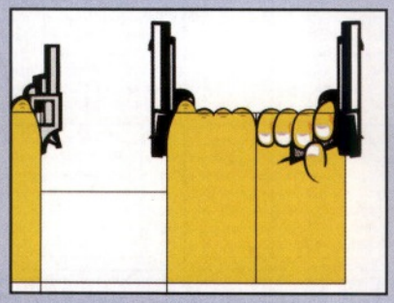


Part 3: Illustrative elements

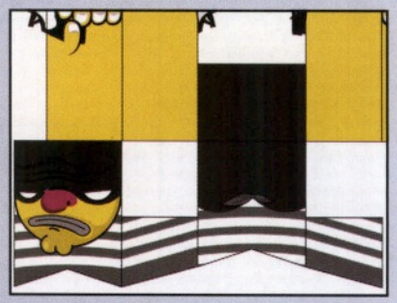
With all the preparation done, you can start adding colour...



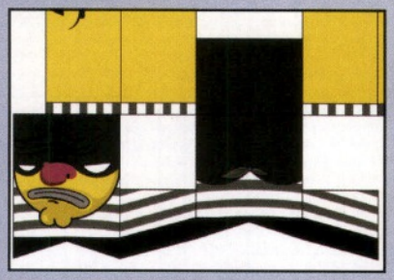
1 Here, we've drawn the hands and guns using the Pen Tool. These elements can then be added to the template.



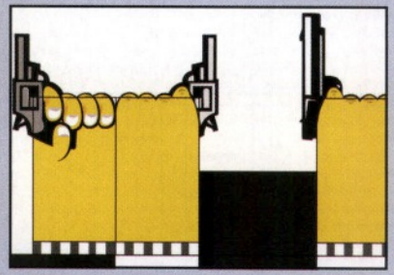
2 Once we've illustrated the front and back of the hand we use the Reflect Tool to replicate it on the other side.



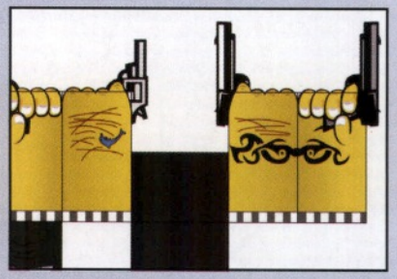
3 Next we create a striped shirt, colour the top of the head to match the robber's bandana, and illustrate the knot of the bandana on the back of his head.



4 We add his trousers by placing a black bar across his lower torso, making sure to align this with the angle of the two sides. We add sleeves to the arms by creating a long grey rectangle with smaller white rectangles on top of it, keeping the spacing uniform by using the Horizontal Distribution options in the Distribute Objects palette.



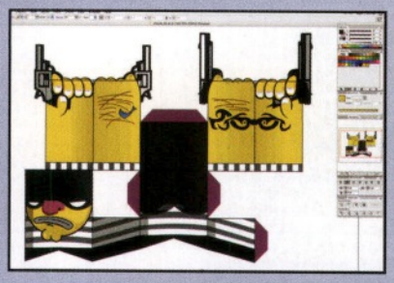
5 We add shading to the left side of the body using black rectangles, with their blending mode set to Multiply and their Transparency set to 40 per cent. We make the insides of the guns a little darker to create the impression of light and shadow when the character is printed.



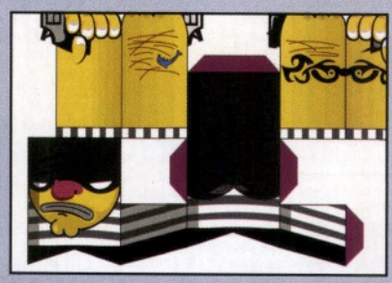
6 It's a good idea to add small details that give your character an added sense of authenticity. Here, we've given our robber a couple of tattoos, and added hair and shading to his arms. We also added some pockmarks on his nose.

Part 4: Assembly instructions

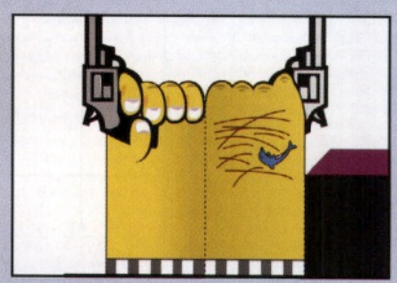
Set up guides and instructions to help people put your character together...



1 Create a new layer called TABS, and place isosceles trapezoids on either side of the character's back, on the top of the head, and at the sides of the torso. Colour the tabs to complement your illustration.

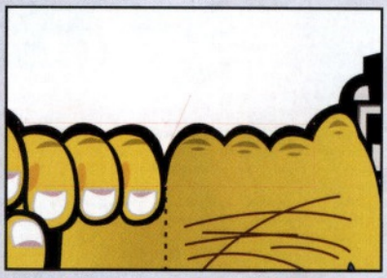


2 Now you need to create the score lines. Unlock your OUTLINE layer, and edit the paths so that none of the lines are overlapping.

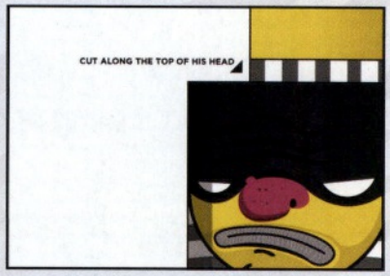


3 Make each line that needs to be folded a dashed line, and make sure you change the colours of the lines so that you can see them on varying background colours. The best way to do this is to make the path a 2pt/3pt dashed line, and then break the path up with the Scissors Tool at the points where a colour change is needed.

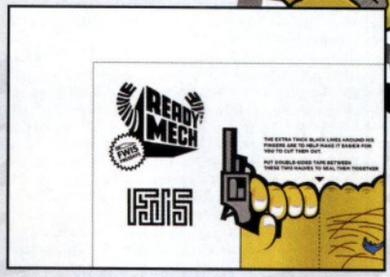
Assembly instructions, continued



4 Add thick black outlines to all your curved lines. This will make it easier for you to cut around these areas without leaving traces of the white background.



5 Guide your builder with notes placed around the template in a new layer called NOTES. For instance, 'Cut along the top of his head' would be helpful, and you also need to include a 'Score along dotted lines' note.



6 Add your logo or URL, or any other decorations you think might be applicable, in the white space around the template.

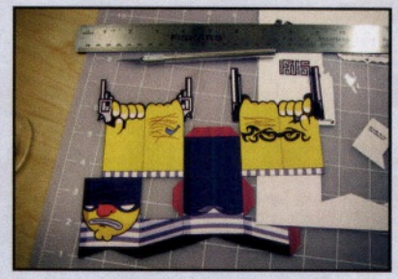
Part 5: Printing and assembly

Print out your paper model and make sure it works before distributing it...

Scoring techniques

It's best to work with an old blade when you're scoring the paper. If you use a blade that's too sharp it's easy to cut your scores too deep, which will leave your folds weak and easily broken.

1 With all the planning and designing done, print out your template on some thick matte paper. It's time to see if it works! Experiment with the spacing until you get the desired result.

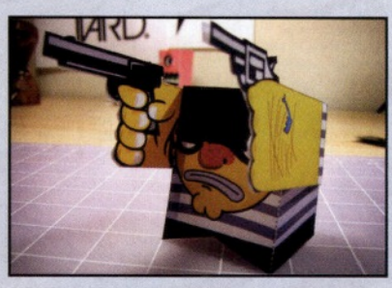


2 Cut along the outside of the shape using a scalpel – you'll see now why those thick black outlines around the curves are handy.

3 Score all your dotted lines by running your scalpel blade gently along them.

4 Bend your folds to make sure that you've scored them all. This will also make taping the shape together easier.

5 Stick a piece of double-sided tape on the underside of the arms, and stick the two halves together.



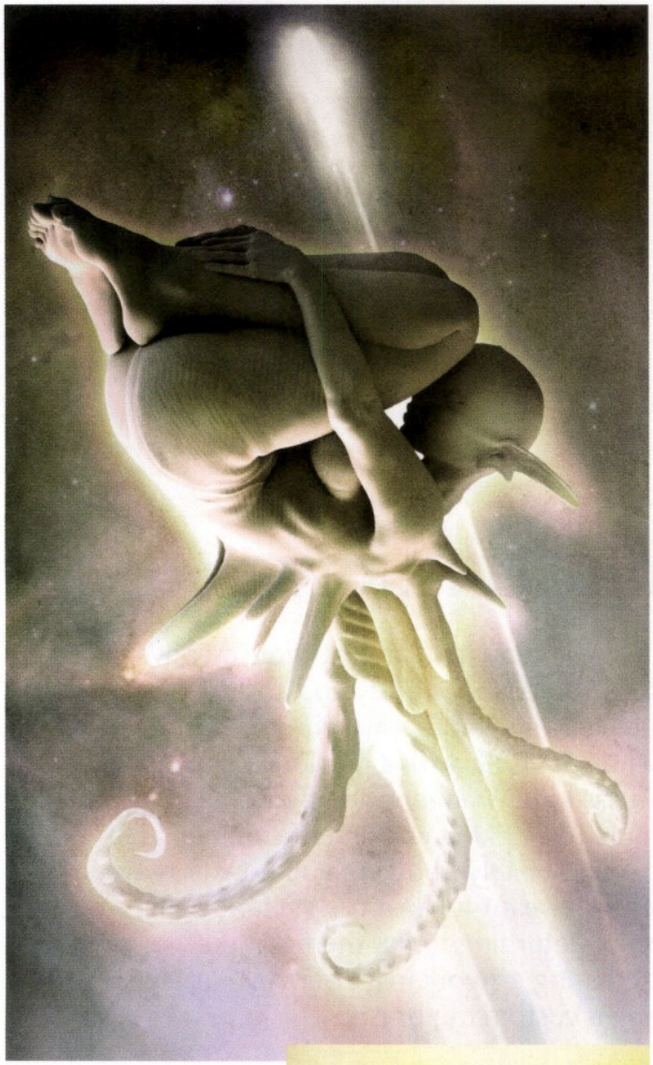
6 Using more double-sided tape, bring your tabs together and build your character. Try to tape the tabs together in a linear fashion – if you jump around from side to side, you'll probably end up unable to gain access to a tab because you've already sealed that side with another tab. ■

2

Fabulous Photoshop

We begin this chapter with a look at three creative fields in which *Photoshop* is a key application: fantasy artwork, game design and graffiti. Then we get to work in *Photoshop* itself, with a masterclass on adding realistic textures to 3D imagery, and a tutorial on drawing simple but striking character faces. Next we change styles completely, showing you how to draw and then colour a beautiful anime-style fantasy figure. We finish off by returning to the theme of graffiti, with tutorials on creating artwork in a distinctive urban style and designing a custom tag brush.

60	The mystery of fantasy art
65	The art of gaming
68	Urban digital
74	Photoshop masterclass: Texture 3D images
83	Photoshop character faces
88	Draw figures in an anime style
94	Colour your fantasy figures
100	Create graffiti artwork in Photoshop
106	Create your own tag brush



Above: "Fantasy art is for me what is not from this world," says Pascal Blanché. *Space Seed*, his vision of an interstellar Nativity, shows a superb lightness of touch, honed as Art Director on *Myst IV*.

Right: *Gladiator* is a Blanché classic, mixing influences to produce a strange yet familiar feel. "I like to reuse old themes," explains the artist himself, "to make a universe on the edge of two genres."

Feature

The mystery of fantasy art

From demon-slaying barbarians to warring space robots, fantasy art has the world's imagination in a headlock the mighty Conan himself would be pleased with. How did it happen?

As human understanding of the world around us continues to grow, that world necessarily becomes more mundane, and loses its mystery. Fantasy art is a response to this, almost an unconscious one – and, like many unconscious drives, it has more wit than we give it credit for. The best fantasy art acknowledges the source of its urges, and runs with them.

The desire to conjure the imagination on to paper must have struck a lot of people, because the art of the fantastic is everywhere. Big-budget cinema, TV, the internet, books, comics... the proliferation is incredible. "What used to be perceived as 'weird' can now garner an exclamation of 'cool!'," marvels Arnie Fenner, Editor of *Spectrum*, the annual of fantasy art, **[w]** www.spectrumfantasticart.com.

No longer is fantasy the preserve of teenage boys with poor complexions and an unhealthy interest in dungeons. A quick look around shows that it has become the dominant iconography of our time; a closer look shows that it's always been there, just waiting to go overground.

Enduring appeal

People don't just like this stuff – they love it. "I think we need it!" explains Ubisoft's Pascal Blanché, **[w]** www.3dluvr.com/pascalb. "Sometimes it's not easy to live in our world, and people need fresh air." Arnie Fenner shouts his agreement: "We NEED a little mystery, a little thrill in our lives," and fantasy gives us "a safe little taste of that".

But this isn't a desperate enterprise: "At heart it's fun," says Arnie. "It's fun to imagine, fun to think about the 'what if?' questions," and fun to capture them. Pascal too sees the funny side of things: "There is nothing too serious in fantasy... it's all imaginary worlds, you know?"

Then Arnie takes a more serious tack: "You could argue that most religious art – regardless of which religion – could be interpreted as fantasy art." He's aware that this may not be a popular assertion, but he has a point. "A lot of classical painters were doing nothing else but fantasy," chimes in Aleksi Briclot, the man behind those genius Spawn images, **[w]** www.aneyeoni.com.

This highlights the fact that fantasy has a strong realist tendency. John Mueller (**[w]** www.muellerart.com) is a comic book artist, games designer and concept artist who sees this as a strength: "I think this type of stuff is so popular because it is so well executed." For John the desire to see fantasy has always been there – it just took high-tech production techniques to popularise it.

Credibility gap

Despite the fact that the entire world seems to have either come out of the fantasy closet or fallen under Peter Jackson's magic spell, fantasy art still suffers from a bit of an image problem. "It's just that some people find it futile and not serious enough," offers Pascal. But why should that be, particularly given the strong classical influence?

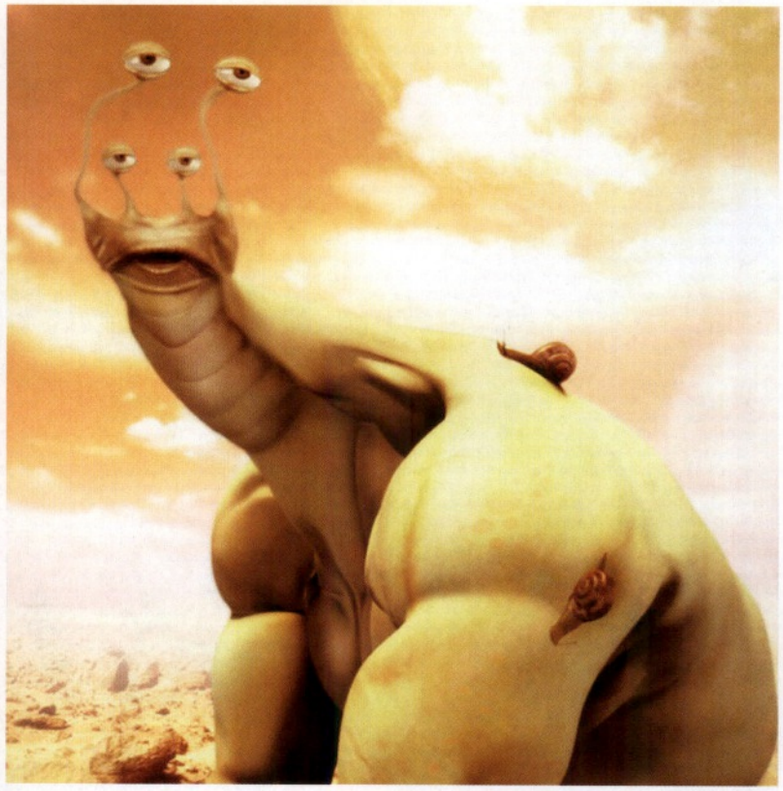
"There's a subconscious suspicion that it's kids' stuff," says Arnie. It's unfortunate, but to some "professing a liking for fantasy is as good as confessing to having questionable taste". Aleksi articulates what others are perhaps thinking, but aren't saying: "Maybe it's because there's a lot of adolescent clichés: muscular barbarians, big-breasted Valkyries and so on."

But why should this discredit the incredible work being produced by the likes of Aleksi, John and Pascal? It's not what you do, it's the way that you do it. As Aleksi says: "You can do fantasy with quality." John goes further by saying that he doesn't believe the image thing is a problem any longer: "I think those people with superior attitudes on the subject are in the minority these days."

As John points out: "Peter Jackson won an Oscar for *Lord of the Rings. The Matrix,*

Above: Pascal's time in the world of video games has led him to value characterisation and appreciate narrative. "I try to add in my illustrations a bit of a storytelling," he says. This image, *Recon*, combines the two well.

Left: As gaming enthusiasts around the world will immediately recognise, this image by former *Swamp Thing* artist John Mueller was created for Id Software's *Quake 3 Arena*.



Above: "There is nothing too serious in fantasy," says Pascal Blanché. Still, the *Dark Lord* looks a bit pensive.

Above right: *Snail Master* shows that Pascal has a sense of humour, something fantasy has a tendency to overlook.

Right: Pascal Blanché in Montreal, where he art directs for Ubisoft.

Hitch Hiker's Guide to the Galaxy and *Sin City* were all number one at the box office on opening weekend." And if the box office statistics don't convince you, Pascal has a simple take on the credibility issue: "Lots of people find it childish to have an interest in fantasy. I think that it's good to be able to revive our childhood."

Fantasy themes

Fair enough, but we've yet to establish the constituent elements of fantasy art – its raw materials, its themes. "Fantasy art has no real boundaries," says Pascal, "do whatever you want." Arnie doesn't believe this limits the genre to simple escapism: "The best fantasy art can explore any and all aspects of the human condition."

Arnie backs up this notion with an example that has almost become an archetype: "One artist could paint a robot rampaging through a city and it would be simple pulpish entertainment." There's nothing wrong with that, he hastens to add, but "another could create a canvas that uses the robot as a metaphor for feelings of detachment or alienation."

He then gets all postmodern on us: "Likewise, how a work of art is interpreted is beyond the painter's control: once it's offered to the public, they view it however they wish, regardless of the artist's original intention." The fantastic is more an attempt to accurately document the gymnastics of the mind. It's unashamedly popular in its aspirations, and that's why it's generally looked down upon by 'high' art.

John Mueller provides an illustration of this. "I think early in my career I had some desire to be 'taken seriously' as an artist." There's no shame in that, of course, but what John came to discover about himself as an artist is that "I'm happiest when I'm painting some big ugly dude smashing the crap out of some other big ugly dude." Round of applause, please.

Community influences

Aleksi Briclot gives us some insight into his creative process: "I like trying new things and discovering new paths." This attitude is a vital part of any healthy art form. "What I love beyond everything is feeding the brain and digging through ideas."

The burgeoning online community, and the success of movies such as *LOTR*, are proving to be something of a double-edged sword for fantasy art, if you'll excuse the expression. On the one hand they're helping to give the medium greater credibility, but on the other there's a risk of originality being crushed. John Mueller is worried about this. "I think if I had a community like the one on the internet when I was growing up, I would be a vastly different artist," he says. "I mean it's cool, but also it's incestuous."

The fine art of matte painting

Max Dennison has an impressive list of credits as a digital matte painter: *The Lord of the Rings*, *Revenge of the Sith* and *The Hitch Hiker's Guide* among them. But don't expect him to steal any scenes intentionally. "My work is most successful if people don't notice it," he says.

The object of the game is to shoot the impossible: "The castle on the hill, the mountains of Mars or the hangar on a spaceship." For this reason, matte painting often overlaps with fantasy art, but it's a wider discipline.

"Fantasy art tells a distinctive story in a very 'literal' way," says Max. "It serves an idea on a plate to you, and tells you clearly that this is what 'my' world looks like." This means that if clients want photo reality, they've already done the imagining, thank you very much. If it's unalloyed fantasy you're after, Max says, then the precursor of the matte painting, concept art, is what you want: "It allows for all the expression that the artist can muster, and is the only time where the artist has licence to fully explore the theme."

Max Dennison has worked on top Hollywood fantasy films including *The Lord of the Rings* and *Revenge of the Sith*.

The temptation simply to copy instead of breaking new ground can be overwhelming. "I think that a lot of artists are cheating themselves out of their own voice," says John. "I try not to peruse the professionals' sites too much. While I love the art, and it being so accessible, you can't 'unsee it'." When you next sit down to work, guess what pops out? Smeagol.

Digital developments

Oddly for a world inhabited by elves and goblins, fantasy has a huge appetite for digital technology. The new generation of fantasists currently swapping notes on sites such as conceptart.org would look at you gone-out if you suggested an oil on canvas solution to that bionic werewolf problem.

John Mueller recalls a time when this wasn't so: "I remember showing someone one of my digital pieces and they were like 'Wow, that's amazing' and they asked 'Can I see the original?'" At this point, John was forced to explain that there was no 'original' as such, just some ones and zeros. "There was sort of this sad disappointed look in their eyes, like I had just pissed on the great mystery of life."

The influence of Hollywood's industrial exploitation of fantasy art is undeniable. It has driven forward technique, and opened up the medium to youths with role-playing habits to feed, in the process generating a global mutual support group for anyone itching to express their fantastical yearnings. This is an unprecedented upswing, but there is a flip-side.

"An original painting can take on a life of its own when hung in a gallery," explains Arnie Fenner. "There's something magic that happens when you're standing in front of an original." This simply can't ever happen with a digital piece. "The computer and the software create an artificial barrier between the artist and their audience," adds Arnie. Finding a way to overcome this could, perhaps make digital truly all-conquering.

The benchmark

To a certain extent, any field of art is defined by the work its leading figures. For fantasy, one name stands out: Frank Frazetta. "Frank is sort of a force unto himself," says Arnie. "He was the perfect artist for the perfect subject at the perfect time." But of course he's not alone. "Frazetta is certainly a quintessential fantasy artist, but there are a lot of quintessential fantasy artists."

Aleksi has the right idea: "The rules are always the same. You have something to express through an image, so find the best way to do it." Take this as your starting point, not someone else's solution to the same problem, and then "it's all about style, composition and colour". In this respect, fantasy is not that different from reality. ■

Above: Todd McFarlane's *Spawn* has never looked more gloriously wicked than when penned by Aleksi Briclot.
© Wizard of the Coast and Todd McFarlane Productions

Right: That looks painful. A piece of Aleksi's work for Oni Gakari.

Opposite page: These pieces show Aleksi's ability to move between styles and moods with ease. "I like to think that what you have to express must dictate the form, and not the opposite," he says.

Full Spectrum anthology

"Art annuals aren't uncommon," confesses Arnie Fenner, one half of the editing duo responsible for *Spectrum*, the fantasy art yearbook. "But it always seemed that fantastic art was under-represented." Not any more.

In 1984, Arnie and his wife Cathy attended an exhibition of science fiction artwork held by the Society of Illustrators in New York. As Arnie recalls, "It was a virtual who's-who of contemporary genre artists," but the Society didn't even do a book or catalogue to chronicle the event. Frustrated at this oversight, Arnie and Cathy set about developing the idea for a fantasy art anthology that would document the best and latest developments in this incredibly vibrant field.

Now on *Spectrum 11*, the annual competition selects from works variously described as fantasy, science fiction, horror or just 'skewed versions of reality'. Preferring this wider remit gives the title broader appeal, and also ensures that "The *Spectrum* books are celebrations of the artists' imaginations."

[w] www.spectrumfantasticart.com

The Best In Contemporary Fantastic Art
SPECTRUM 11
SPECTRUM
FRANK FRAZETTA
ICON
A Retrospective by the Grand Master of Fantastic Art ; Newly Revised & Updated With Additional Art
EDITED BY CATHY & ARNIE FENNER

Now up to *Spectrum 11*, the annual survey of all that's good in the world of fantastic imagery is compiled by the Fenners: Arnie and Cathy.

Feature

The art of gaming

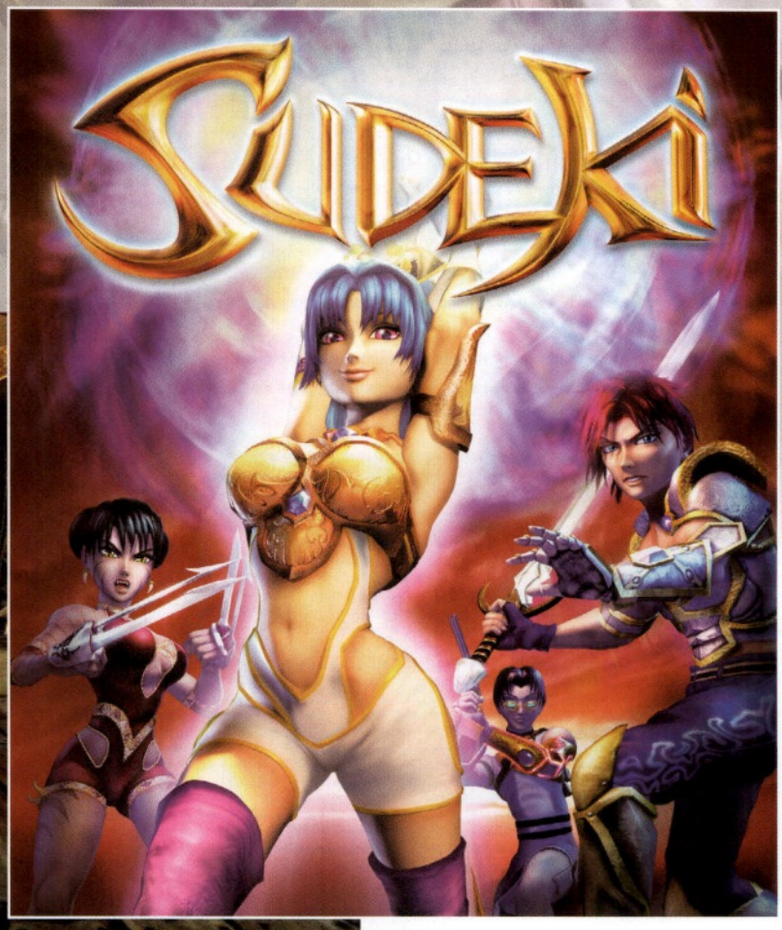
We're bombarded with the kind of fantasy art we see on the boxes of games such as *Fable* and *Sudeki*, but how easy is it to create those images, and what processes did the artists behind them go through?

Walk into a High Street games shop and the first thing you'll notice is an awful lot of artwork. This ranges from in-store displays and posters to the game boxes themselves. The games business today is a multi-million part of the wider entertainment industry, and with the development of titles such as *Doom 3*, *Fable* and *Jade Empire* taking years, and costing more money than you can shake a stick at, one thing's for sure: getting the packaging right is very, very important.

As game development has evolved from a cottage industry to a multi-billion dollar powerhouse, the way in which the companies have gone about selling their wares has also changed. The sub-Roger Dean wizards and goblins of the early days have been replaced by something far more sophisticated and, where wizards and goblins do feature, the way in which they're presented is a world away from the packaging designs of the early 1990s.

The global games industry was worth in excess of $30bn in 2004, but for every runaway success such as *Grand Theft Auto*, *Halo 2* or *Spider-Man* there are plenty of flops. So just how important are promotional and box artwork in making or breaking a game, and how does the process of bringing those games to market work, especially in the crowded fantasy art arena?

The packaging for *Sudeki* took a long time to come together, and was created using *Maya*.



Fact and Fable

Find out how a fantasy art classic was created by Hubris' Todd Elhart (pictured right) and Jo Chen...

Step One: Conceptualising

"The first thing we did with the *Fable* box was the conceptualising," Todd Elhart, Creative Director at Hubris Studios explains. "We developed 12–15 ideas and, through discussion with the developer, narrowed those down to a few sketches which we passed to Jo Chen.

Todd says Chen was chosen because of her background in Manga and comic art, and also because she had a "very cool and distinctive style", and was very flexible.

"She was much easier to work with than some of the older artists, and just a real delight." Todd says. "She was open to ideas, and she re-did the sketches in her own style. She did the character sketches of the boy and was able to get into his head."

Step Two: Creating the basic image

Jo says Hubris already had some ideas about how the character on the cover of *Fable* should look, and that she had screen captures of the game to work from. From this point, the next step was to create the drawings themselves.

Jo usually creates multiple rough sketches in thumbnail format that she can send back and forth to developers and the design team. She creates pencil sketches on paper, and builds up the drawings to ensure proper perspective and dynamics are included.

Step Three: Finishing off

Once the sketch is complete and approved, it's then scanned into *Photoshop*, where a base colour is applied. With *Fable*, all of the painting was done in Corel *Painter*, with *Photoshop* in use simultaneously so that Jo could toggle between the two applications.

"I paint them exactly as I would paint in oils or acrylics," explains Jo. The brush strokes are real, and they're done with my graphic stylus rather than a brush."

Once the striking cover painting had been conceptualised, sketched, painted and finished off, the image was ready to go, requiring just a few final tweaks in *Photoshop*.

The development of a game's packaging can be based on screenshots of the game, but often starts with just a marketing presentation, leaving the artists to create something out of very little.

The finished image was completed from pencil drawings scanned into *Photoshop* and finished off using *Painter*.

Powerful packaging

Two of the big successes of 2004 with a strong fantasy art feel were Lionhead's role-playing adventure game *Fable* and Climax's RPG *Sudeki* (**[w]** www.lionhead.com), both published by Microsoft Games. The team behind the strong fantasy packaging of both titles was California outfit Hubris Studios (**[w]** www.hubris-studios.com) whose chief designer, Todd Elhart, believes that games packaging is more important now than it has ever been, especially as games are competing head-to-head with so many other forms of entertainment.

"The packaging completely sets the tone for the whole game, and all of the marketing that goes along with it," explains Todd. "There are lots of different types of entertainment out there – DVDs, movies and CDs – and games are competing with all of those things. "Hardcore gamers will read the magazines and look at the websites, and they know what they're going to buy, but a lot of sales don't happen like that – they are based on someone just walking into a shop and looking at what's on the shelf."

This is a fact that obviously hasn't passed the games developers and publishers by. They are only too aware of the make-or-break nature of box design, and this has lead them to use every trick possible to get the packaging right, which in turn has lead to a fairly tough process in terms of packaging design and development.

"You're talking about a game which has taken 40 people two years to develop, and the publisher is spending hundreds of thousands of dollars on marketing, so you've got to get it right," says Todd. The process starts with a brief, and usually a PowerPoint presentation. "This will let us know what target market we are aiming at – for example, boys aged 14 to 25 – and give us something to start with," Todd explains. "The developers know the competing games, and they want theirs to stand out."

Having fun with Fable

The development of the *Fable* packaging was, says Todd a "lot of fun" because Lionhead wanted something a "little different, and a bit more conceptual than normal" – a process which eventually led to the innovative twin reflection image.

"We started with a lot of sketches and showed them all of our ideas," says Todd. "In *Fable* we saw an 18-year-old character looking down at his evil twin – we started with the character being older, but they wanted it to be a boy."

Once the conceptual bridge had been crossed – for both *Fable* and *Sudeki* – Hubris turned to its bank of freelance artists to develop the sketches into something resembling the cover art that appears on the box. "Once we have a concept and around 12–15 ideas, we go to our artists and get them to turn it into something more finished," explains Todd.

With *Fable* this was a relatively straightforward process, involving work that up-and-coming Manga, Marvel and DC comic book artist Jo Chen ([w] www.jo-chen.com) developed and finished using scans, Corel *Painter* and *Photoshop* (See 'Fact and Fable' on the facing page). The cover art for *Sudeki*, however, has a more rendered 3D feel, and, because of this, was a more complicated process, as Todd explains. "With *Sudeki* we came up with the sketches of the characters at a low angle with a burst of light coming from above – an illustrator named Albert Co did them. *Sudeki* was mainly done in *Maya*. 3D modelling takes a long time in terms of things like hair and cloth, but we developed it, rendered it, and painted it in *Photoshop*. We re-did the sky and background. The background is real sky that has been computerised in *Photoshop*."

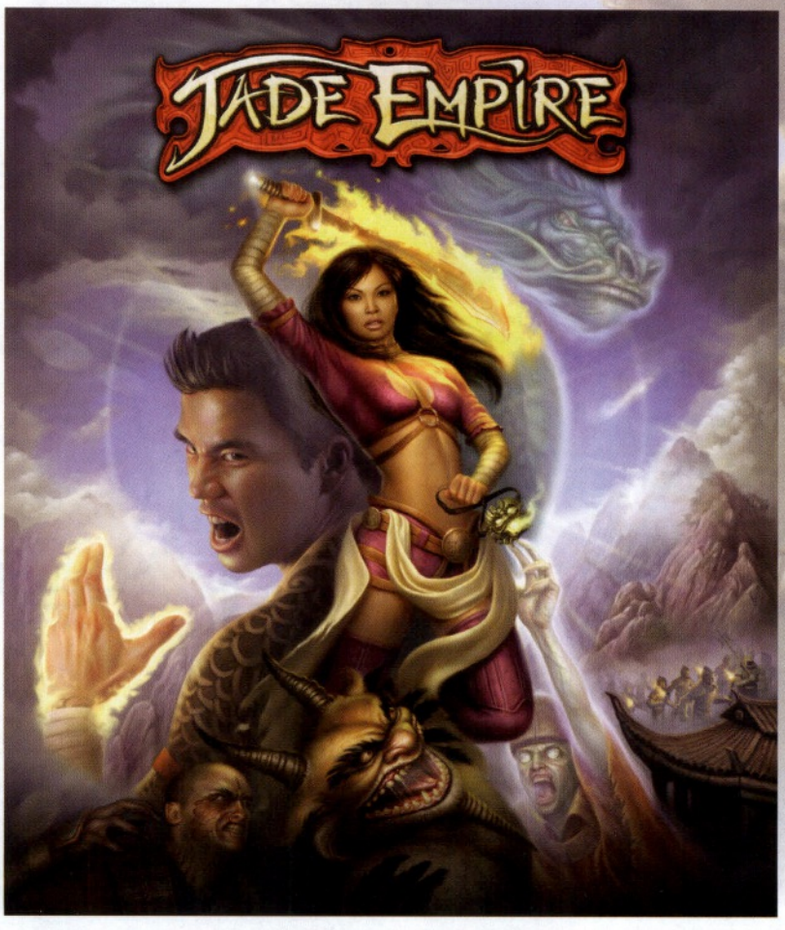
Doom design

Over at game developer BioWare ([w] www.bioware.com) – the company behind the phenomenally successful *Doom* series – veteran packaging designer Mike Sass ([w] www.sasssart.com) is also a big fan of 3D software, and a keen user of the gaming industry's standard application *3ds max*. That said, he also believes that a good packaging image, such as the one he created for *Doom 3*, should transcend the application in which it was created. "A good composition will outweigh a good bump map in terms of the viewer's appreciation of a static image," explains Mike. "In terms of creating artwork, I have learned through experience what aspects of a job will require the most attention due to the job's purpose, and I can easily focus my energies on what will be most important in any particular task."

Understanding marketing

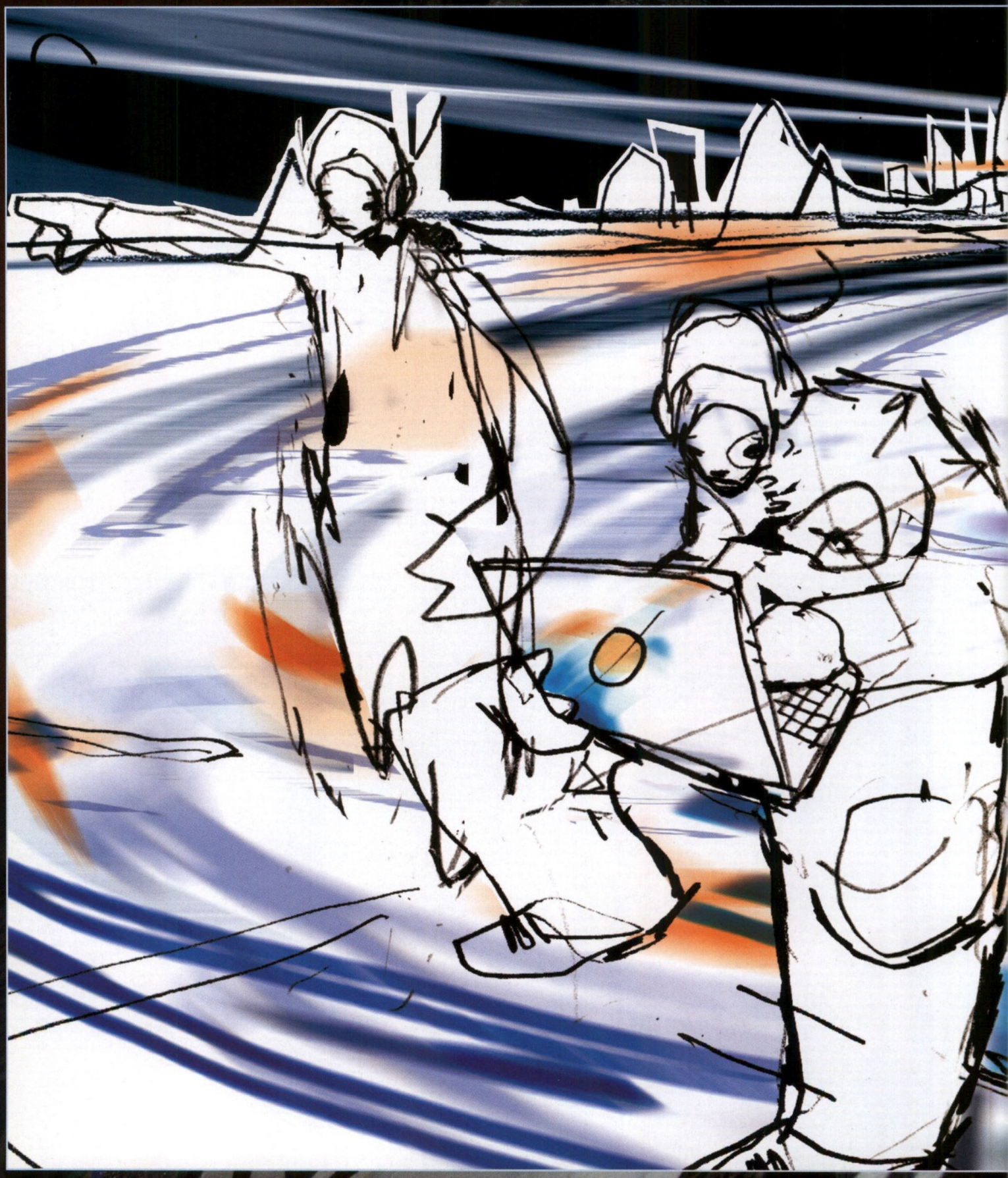
It's clear from the experiences of Todd, Jo and Mike that raw artistic talent is important if you want to follow in their footsteps, but, as with most things in the design industry, there's a lot more to it than that – in particular you need a keen understanding of how marketing entertainment works.

"You need to get into the head of entertainment marketing – things like music CDs and club flyers," explains Todd Elhart. "It's not exactly the same thing, but you are selling entertainment and that's important. You also need to have the ability to create things out of nothing – that's what we look for in people. But it's interesting to see that designers today are a lot more open than they were, say, seven years ago: they have many more influences." ■



Above: Good game packaging should transcend the application in which it was created, according to Mike Sass of BioWare, developers of the *Doom* artwork.

Left and far left: Like *Fable* and *Sudeki*, BioWare's *Jade Empire* has used the fantasy art formula to great effect.



Feature **[illustration]** Stefan Plaetz **[w]** www.scrawlcollective.co.uk/steff.htm

URBAN DIGITAL

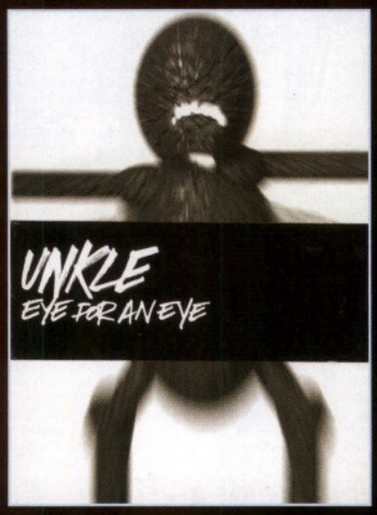
The 1970s and 80s saw the emergence of graffiti culture, and its transition into a respected art form. Designer **Ric Blackshaw** traces the roots of his own passion for a whole new graphic language

At Scrawl Collective, the agency that I run for illustrators and designers, we have a motto: 'Hand B4 Mouse'. However, this isn't the modern-day Luddite's axiom that it might sound like. Much of the work we do is, in fact, digital: the motto merely reflects our belief in the superior aesthetics of the hand-drawn approach.

In the same way that musicians in the late 80s and early 90s would bemoan the lack of feel in drum patterns sequenced on *Cubase*, we at the Scrawl Collective rail against what an artist once eloquently described to me as "the high-tech flashiness of digital graphics that scream out for the human touch". However, when programs such as *Streamline* came out, it suddenly became possible to take hand-drawn into the digital realm without losing the look and feel of the original work.

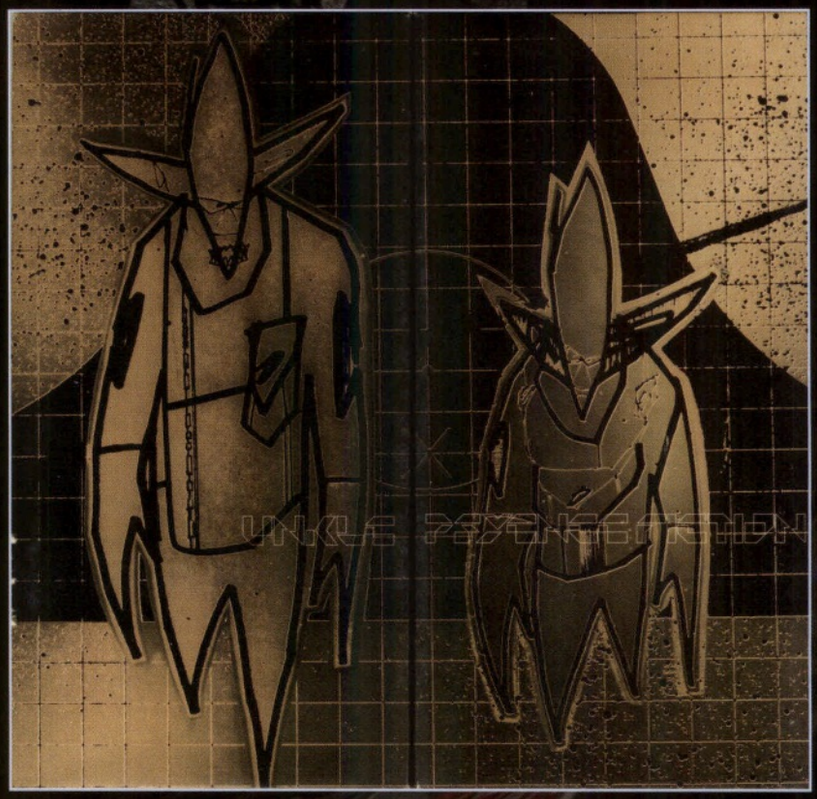
All the artists at Scrawl Collective, no matter how *Photoshop*-literate and *Illustrator*-savvy they may be, begin their >

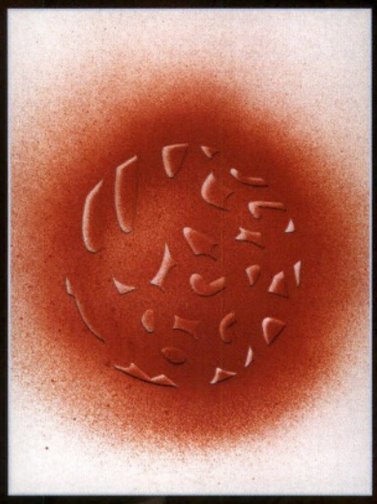
Ric Blackshaw is the founder of Scrawl Collective [w] www.scrawlcollective.co.uk



Far right: Ben Drury's limited-edition packaging for the Unkle CD *Psyence Fiction*, featuring Futura's famous alien characters.

Right: another classic piece of Drury design, featuring the artwork of 3D from Massive Attack.





Right: Ben Drury avoids cliché by using the techniques of graffiti, such as stencilling and tagging, in an unorthodox way. This detail from a Luke Vibert 12-inch promo is a perfect example.

Below: Drury is a regular Unkle collaborator.

work with something that's hand-drawn or hand-rendered in some fashion. We are by no means alone, or for that matter particularly original, in taking this approach to our work. I first picked up on it when researching the first Scrawl book, *Scrawl: Dirty Graphics and Strange Characters*. My co-author Liz Farrelly and I identified a generation of artists, designers, film-makers, illustrators and fashion designers who, while stylistically very diverse, nonetheless had certain things in common. The sampling and remix culture of that era's music scene had crossed into the culture's visual world.

The DIY ethos of punk and hip-hop, and the visual expression of these movements, inspired a generation of young talent to 'get up', to use the vernacular of the graffiti scene, and start creating their own stuff. All the signifiers of this rich urban environment – graffiti, comic books, movies, packaging, music, fashion – went into the mix. In those early days, the rules were not yet set in stone. Although they probably didn't know it at the time, the artists and designers of this period were not only creating a new design aesthetic, but a new lifestyle to go with it: something that straddled the personal vision of the artist and the practicalities and constraints of the commercial world.

The graffiti artists of New York City who pioneered this scene in the 1980s could hardly have imagined that what they were doing would become so popular and influential. Lee Quinones was one of the pioneers of the street art scene, famously appearing in the movie *Wild Style*, but there's a misconception as to how easily these guys took off as artists. A few, including Quinones and Futura, were taken up by galleries early on, but the response of the critics was lukewarm at best.

Even today, artists perceived as more gallery-friendly and whose work sells for thousands, such as Jean-Michel Basquiat and Keith Haring, have their various merits – or the lack of them – debated in art circles. There was, and is, a lot of snobbery about graffiti. A lot of artists who got into galleries in those early days were briefly the flavour of the month, but the whole 'gallery machine' experience left a lot of people with a nasty taste in their mouth – and left the graffiti scene in general doubly wary of outsiders with dollar signs in their eyes.

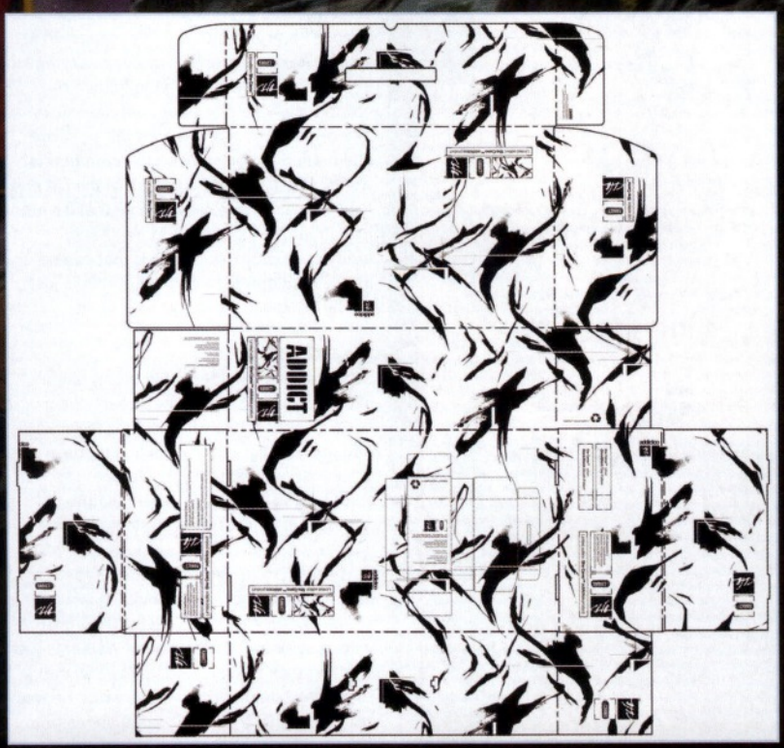
Hard graft

Quinones and Futura are now both highly successful, but it hasn't been an easy ride. For instance, Futura famously got his break when The Clash asked him to do their stage backdrop, and brought him over to London; he later made a record with them. But between that early recognition and the success he enjoys today there have been

many ups and downs. In the intervening years he had to do many things to make ends meet, including a stint as a bike messenger. His journey back to prominence began in the 1990s, when James Lavelle began buying his work and using it as the sleeve art for his fledgling record label Mo'Wax. These days, Futura is known and respected as much for his graphic design and clothing labels as he for his graffiti art.

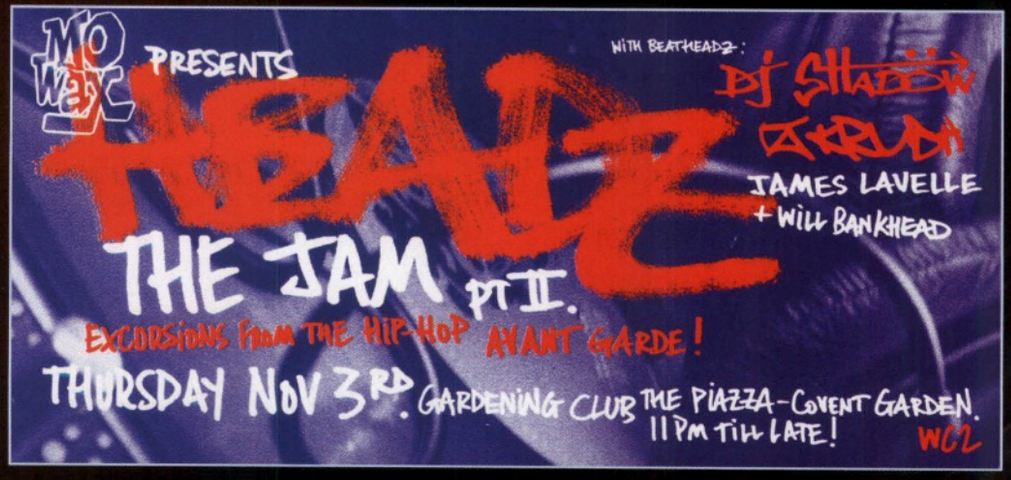
The hardships of first- and second-generation NYC graffiti artists were not in vain, however. It is they, and documenters of the scene such as Henry Chalfant, who can now take the credit for starting a movement that has spread globally, and inspired thousands of kids to pick up a spray can. Artists such as Futura pioneered the graffiti artist, designer and entrepreneur blueprint followed by so many professionals today.

In the UK, early exponents of this visual language and lifestyle, such as Swifty, quickly became synonymous with the artwork of London's bustling nightlife and music scene. From the beginning, Swifty made a strong case for graffiti's influence on this culture, where the commercial work came as much from being on the scene, making connections and being able to tap into that rich seam of inspiration as it did from having qualifications or a background in graphic design. "Street art has finally come of age," he explains. "It's not just for >



SheOne started his career as a graffiti artist creating chunky letters and acid colours like everyone else, but he soon began to develop new styles. Here you can see the beginnings of this development from 1994 (top), when his letter forms still had that solid black outline but were already becoming more abstract to 2002 (above left), where we see his work adapted for the gallery, and the progression to the minimalist abstraction that typifies his work from this period; and finally a piece from 2004 (above) in which colour has returned to his work, and the letterforms have mutated further still.

Left: A typical example of SheOne's graphic design, taking elements from his spray painting style and adapting them to a graphics brief – in this case, packaging for the clothes brand Addict.



Top: Stencilled murals at Soul Tree in Cambridge, produced by Swifty in June 2005. It was a commission won on the strength of his enduring work in the magazine *Straight No Chaser*.

Above and above right: Swifty's typography for his own graphics, labels such as Talkin' Loud and club flyers – like this early example from the Mo'Wax label's club night Headz – set the look for 1990s London nightlife.

Right: Drawing on graffiti and comic books such as *Fantastic Four*, Mr Jago is famous for his robots. Here's a piece worked up on the Mac: you can see how it retains its hand-drawn, human feel.

the hip-hop generation now." He adds: "As traditional graffiti has been around now for some 30-odd years, there's a heck of a lot of history. It's grown into a highly respected art form that once again is gracing gallery walls, but it's also had a profound influence on graphic designers and commercial artists like myself, who have backed the art form and helped push it into today's commercial world. Artists like Banksy here in the UK and Futura in NYC have shown us all that it's not just about getting up, but more about creating personas and brands that can be marketed, copied and idolised. This is just the beginning."

New directions

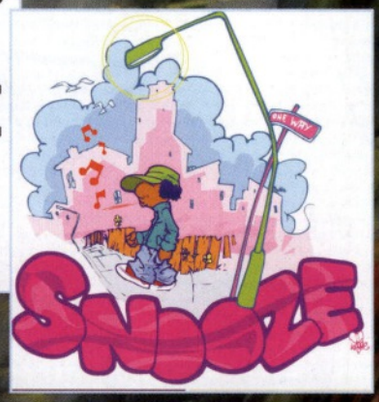
Some people may decry the urban blight of the ubiquitous tag on the streets of our cities, but it's impossible to deny the influence that graffiti has had on modern graphics – not that this should come as a surprise to anyone. The main feature of graffiti – indeed its most basic concern – is lettering.

Graffiti could be described as typeface design on the hoof, and many of the early graffiti artists went on to design their own fonts in later life. Bristol's Nick Walker is just one who took the skills he learned on the street and adapted them to the world he was creating on his Mac, taking influences from dystopian science fiction as well as graffiti, and creating alien alphabets.

Some graffiti artists took their skills with letterforms in other directions. SheOne was one artist who, in the early days, took his typography beyond recognisable graffiti styles and developed them to become more abstract. These went on to inform his work as a graphic designer. "My G4 laptop is the most natural way of assembling my large-scale paintings into viable product design," he says. "I start by digitally photographing paints, either in the gallery, on canvas or in illegal locations around the globe. This raw data is edited, shaken and stirred in *Photoshop*, and assembled into a finished product. I guess you call this design. I enjoy the instant rendering of ideas available through this method. One can travel with the laptop and camera – it's an instant interface, and allows for complete authorisation of one's own language.

"My painting can be simply applied to pretty much any brief: my current project is the SheCamo, a fabric design for the Addict clothing brand, in which painted details are used to create a repeat pattern fabric and used for high-end winter jackets, which come in a box also carrying the motifs.

Others still turned their hands to illustration, concentrating on developing the cityscapes and moody-looking



Clockwise from right:

Attracted by graffiti's style, Wayne Snooze turned to illustration and design, finally allowing computers into his analogue world. This street-inspired illo comes complete with tag.

A classic Will Barras example of how a piece of work made in *Illustrator* (in this case a page from a comic book produced to accompany the release of the Hint album on Hombre Records) can inspire a painting.

Nick Walker created the Dragon Stance font for the drum 'n' bass label Dope Dragon. It was first used on the 1998 compilation *Wayz of the Dragon*.

characters that bookended so many graffiti pieces in the early days. Wayne Snooze grew up reading comics such as *2000AD*. When he was first bitten by the graffiti bug (inspired by the seminal Judge Dredd story *Un-American Graffiti*), he favoured the marker pen approach, but was soon creating cartoons and, later, nightclub projections.

"It took me a long time to change over to the digital format, as I had no respect for computers," he says. "I enjoyed doing things by hand, and felt that using a Mac was cheating. Eventually I was cornered, and had to use one, and I was amazed at how helpful it was. It was just another tool, and now I find it hard not to use it."

Graffiti dreams

Not only were graffiti artists teaching themselves *Photoshop* and *Illustrator* and turning pro, but a whole generation of design students was looking at graffiti, experiencing the resurgence of skate culture, and bringing this visual language into their own work.

Mr Jago, Will Barras and Steff Plaetz, the first Scrawl Collective artists, all came from this second generation. Rather than going down the graffiti path, they created freehand drawing styles that they developed over time as designers and artists. Here the line was again being blurred between the purely digital and the hand-made. A sketch may be scanned and streamlined, developed on the Mac and printed out, and end up as the basis for a painting; equally a painting may inspire a piece of graphic design. Whatever the process, it's graffiti's hand-made quality that gives their work its character. It's here that the imperfections lie, the tiny flaws that draw the human eye: the awry pencil mark, that stray drip of paint. It's what gives their work the human quality that people respond to.

Today we have the strange situation of graphic design students going out and doing graffiti. It's no longer just the kids off the estates; now nice middle-class boys are out there stickering and stencilling, with dreams of being the next Banksy. This has led some to warn that, as someone once pointed out to me on the subject of football, "Once the middle classes get into it, it's over."

The risk-taking nature of the graffiti artist's life was an ideal preparation for the life of a freelance artist and designer: it forged the entrepreneurial spirit they needed to help them survive.

Those early graf heads, and the designers they initially inspired, created a new way of working, where the ability to hustle was as important as the art, and where the artist became the brand. Today we are lucky to live in a world that these pioneers created. ■

Ben Drury and Mo'Wax

Ben Drury was in-house designer at Mo'Wax Records during the label's most influential years. Working with artists such as 3D of Massive Attack and Futura, Mo'Wax's output was as famous for its iconic sleeve art as it was for its music. The label's commitment to original and striking packaging was as astute as that of Factory Records before it. Mo'Wax's championing of graffiti artists played a central role in the renewed interest in the art form during the 1990s, with the use of the medium in a new context causing people to see graffiti in a different light.

Drury explains: "When designing for Mo'Wax we never used graffiti in context, which is why Futura, 3D, Req and the others were always so interested. I think they saw the benefits of using their artwork on sleeves and as an extension of the art form... another means of getting up, getting their work to a wider audience.

"Futura once said to me that his web design and most other enterprises he engaged in were all forms of getting up. The nearest I ever came to graffiti in context – that's to say, spray paint on walls – was on the *Holonic* sleeve for DJ Krush, which used an image of a gallery sprayed by Futura. All the spray-painted imagery I ever used was one step away from any conventional interpretation of graffiti. Most paintings were already on canvas, and in many ways I dealt with the elevation of the art form... trying to handle it in a more respectful way, more like fine art than merely documenting street art."

Above: Mo'Wax record sleeves have often been inspired by graffiti, but the connection has never been more overt than on the sleeve for DJ Krush's *Holonic*. Renowned street artist Futura was given free rein to spray the walls of an art gallery for the photo shoot.

PHOTOSHOP MASTERCLASS

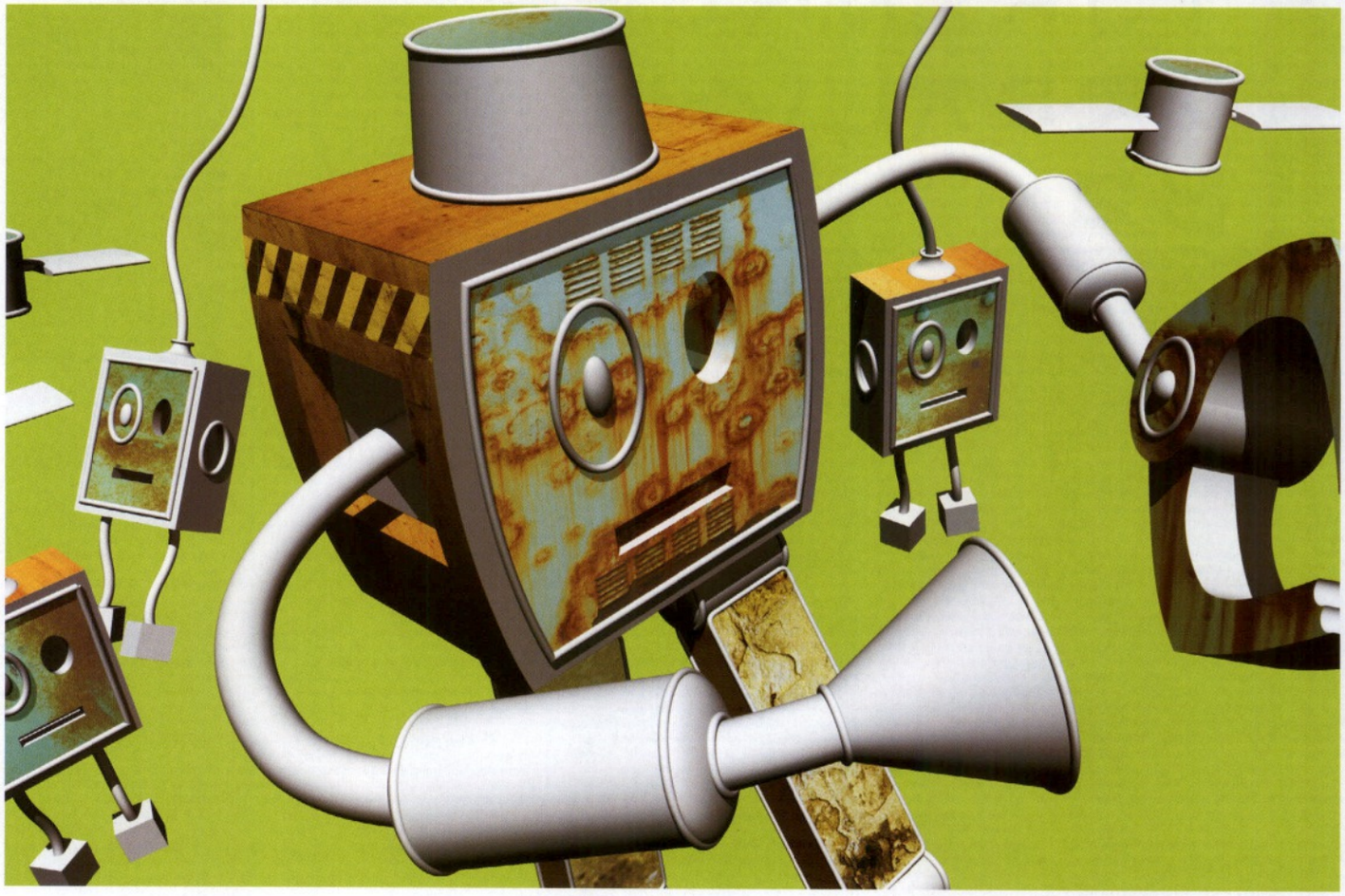


Illustration by Derek Lea [w] www.dereklea.com

Texture 3D images

All the resources needed to complete this tutorial can be found on the CD, in the Tutorials\ Photoshop Masterclass folder

Derek Lea explains how to add textured surfaces and tactile elements to 3D renderings in Photoshop. The unique results will reveal a combination of the depth provided by 3D and the painterly freedom of working in 2D

There are several reasons why you might want to apply surface textures to finished 3D renderings in *Photoshop*. Perhaps you're not a 3D expert and, although you can model objects effectively, you find texture mapping a frustrating experience. If you're proficient in *Photoshop*, but not so masterful when it comes to working in a dedicated 3D application, then the next eight pages are definitely for you.

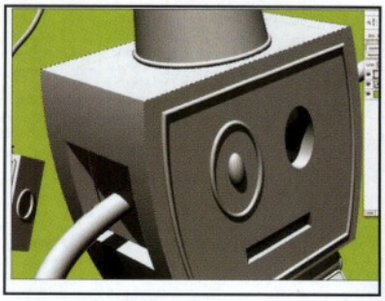
You don't want your 3D renderings to look the same as the work of every other artist using the same application, and texture mapping is the solution. *Photoshop* provides a range of tools that enable you to easily map imagery on to your 3D renderings in perspective to create a convincing result. And, at the same time, *Photoshop* also gives you the flexibility to create an original work of art using a texture-free 3D rendering, resulting in an image that deviates from the signature look of 3D modelling applications.

In the first part of this tutorial we'll show you how you can add texture images to surfaces in perspective, using a combination of *Photoshop* tools, both new and old. You'll be shown the techniques you need to add artwork to individual surfaces, matching perspective perfectly on a series of layers using *CS2's* Vanishing Point feature.

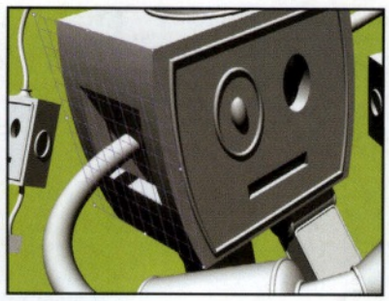
Once you've completed the first part of the tutorial we'll show you how you can wrap images around cylindrical shapes, and explore the possibilities of another *CS2* feature – smart objects. We'll finish off by looking at how you can use brush effects and flat textures, and edit channels, to complete the 3D illusion.

Texture mapping

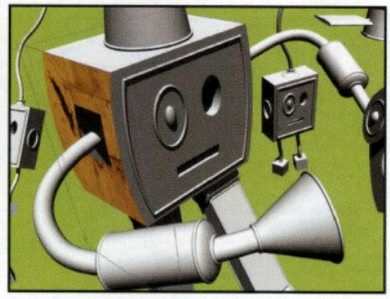
Use the Vanishing Point filter to apply a texture in perspective...



1 Start by opening the 3Dlayers.psd file, which you'll find on the CD, in *Photoshop CS2* (follow the link on the CD to download a trial version if you don't have it). Use the Pen Tool to draw a path that traces the outline of the left side and top of the main figure's torso. Generate a selection from the path using the option in the Paths palette menu, and then create a new layer.



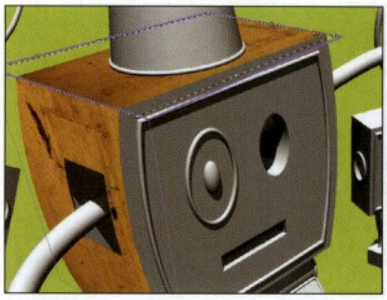
2 Now open the yellow2.psd file from the CD. Select All and Copy. With your new layer targeted in your working file, and the current selection active, go to Filter > Vanishing Point. Use the Create Plane Tool (the arrow) to click on the four points of the figure's side to create an editing plane – this will define the perspective.



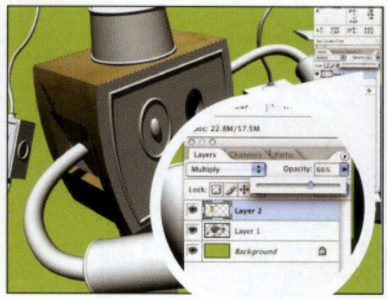
3 Next use the Create Plane Tool to click on the top centre point of the existing grid, and drag it across to the right to create a perpendicular grid across the top of the torso. Now use the Edit Plane Tool to select the first plane, and paste the copied texture image on to the plane.

Paste Into

The Edit menu's Paste Into option enables you to paste a file or selection into your document as a new layer. The nifty part of this feature is that it masks the layer according to the currently active selection. By default the mask is not linked to the new layer in the Layer's palette, which allows you to position or reshape the contents within the mask, and independently of the mask already applied to that layer.

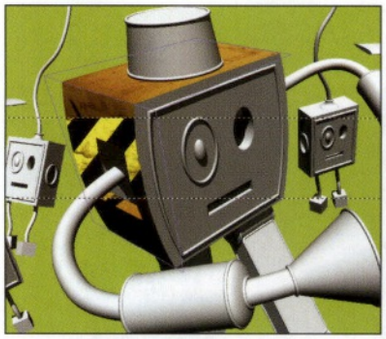


4 Select the Transform Tool, and click and drag on the corner points to reduce the size of the pasted image on the new plane within the area defined by your initial selection. Hold down the Alt/Option key, click within the selected area and drag it on to the perpendicular plane.

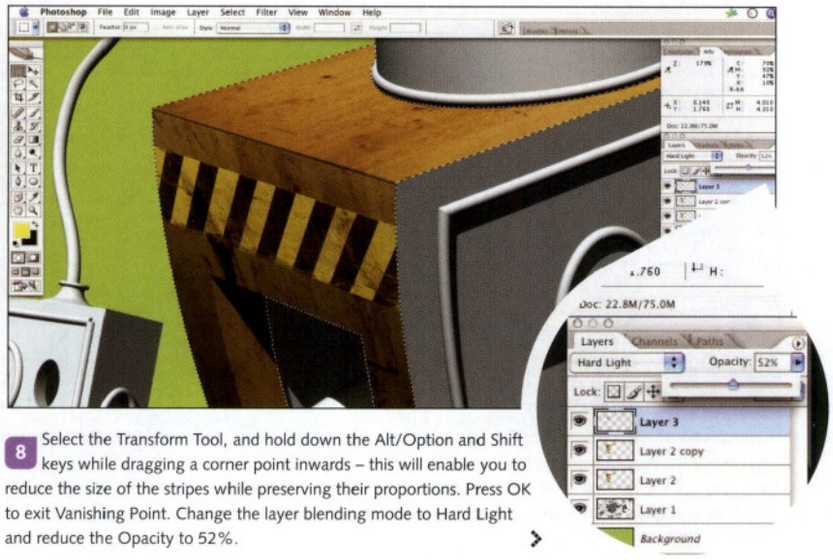


5 Again, use the Transform Tool to click and drag on the bounding box handles, resizing the selected area until it covers the entire plane within the selection, then click OK to exit the Vanishing Point filter and apply the effect. Change the blending mode of the layer to Multiply and reduce the Opacity to 66%.

6 Duplicate the layer, and change the blending mode of the duplicate to Overlay. Ensure that your selection remains active – be careful not to deselect it. Create a new layer, and open the stripes.psd file from the CD. Select All, Copy, and then return to the working file.



7 You'll need to ensure that the current selection is active, and that the new layer is targeted in the Layers palette. Go to Filter > Vanishing Point and you'll notice that the grids you created previously are still active. Paste the copied stripes on to the side of the torso.



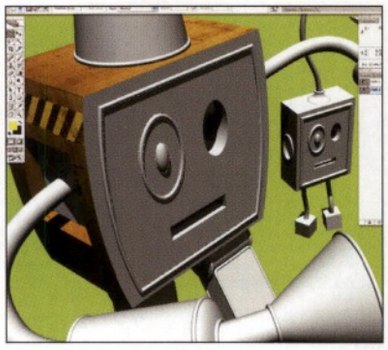
8 Select the Transform Tool, and hold down the Alt/Option and Shift keys while dragging a corner point inwards – this will enable you to reduce the size of the stripes while preserving their proportions. Press OK to exit Vanishing Point. Change the layer blending mode to Hard Light and reduce the Opacity to 52%.

Texture mapping, continued

Add textures to the rest of your characters...

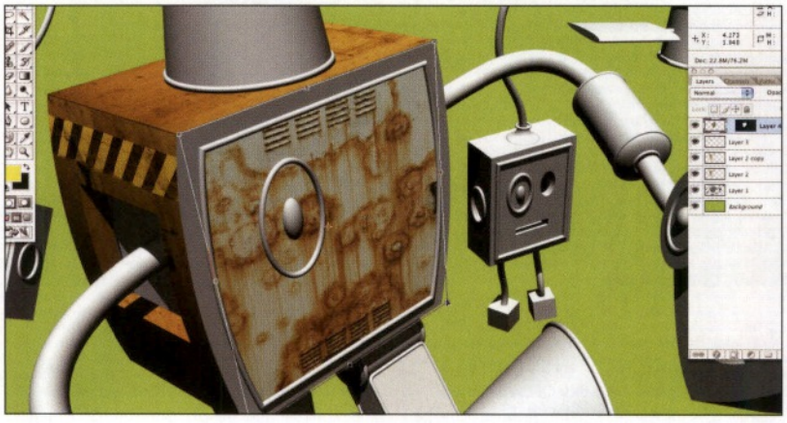
Compound path selections

Isolating areas of this 3D image with paths will be a complex job in some areas. You'll need to pay careful attention to the 'path area' buttons in the tool options bar while creating paths made up of multiple components. For instance, create a selection with the 'Add to path area' button enabled then, to define an area that will punch a hole in your initial selection, ensure that the 'Subtract from path area' button is clicked. These functions aren't permanently fixed – you can always select a path component and then choose another path area function in the options bar.



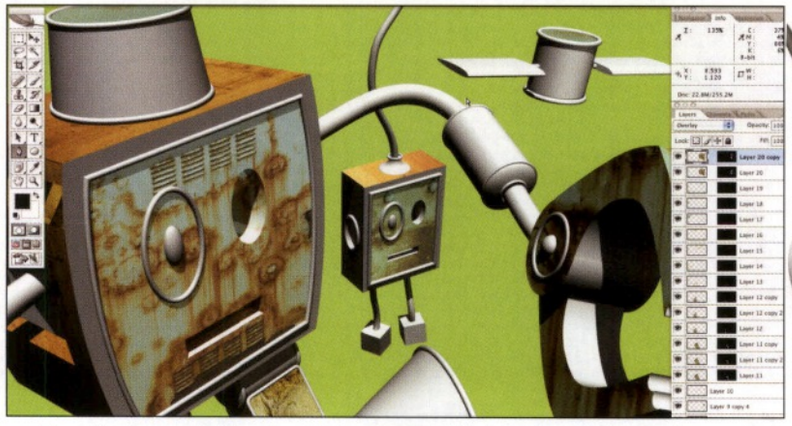
9 Open the rusty2.tif file from the CD. Select All and Copy. Return to the working file and hit Ctrl/Cmnd+D to deactivate the selection. Use the Pen Tool to draw a path around the central area of the main torso, but exclude the eye details and framework. Generate a selection from the path.

10 Target the top layer in the Layers palette, and press Ctrl/Cmnd+Shift+V to paste the copied image into your working file as a new layer that's masked based on the currently active selection. Target the new layer – not the mask – and choose Free Transform from the Edit menu.

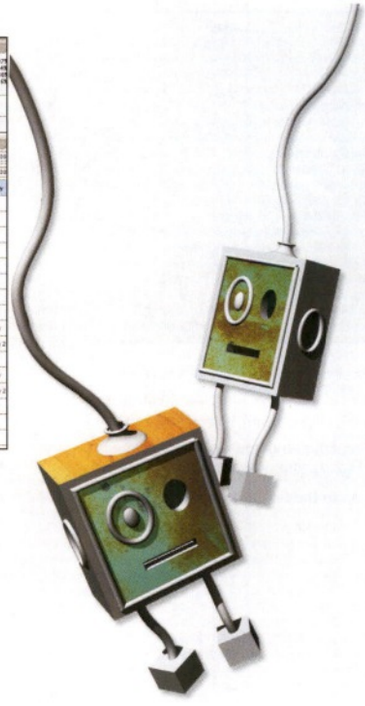


11 When the bounding box appears hold down Ctrl/Cmnd and drag the four corner points to their respective positions on the chest plane. Holding down Ctrl/Cmnd enables you to distort the bounding box freely. When you're satisfied with the results, hit Enter to apply the transformation.

12 Change the blending mode of the layer to Overlay, and reduce the Opacity to 22%. Duplicate the layer, change the blending mode of the duplicate to Screen and increase the Opacity to 31%. Now duplicate this layer, change the blending mode of the duplicate to Overlay and increase the Opacity to 100%.



13 Repeat the steps outlined here to add textures to each of the flat surfaces of the 3D rendering. There are a number of other surface textures included on the CD, so make use of them, and remember to employ a variety of blending modes and Opacity settings so that the textures blend in nicely with the underlying rendering.



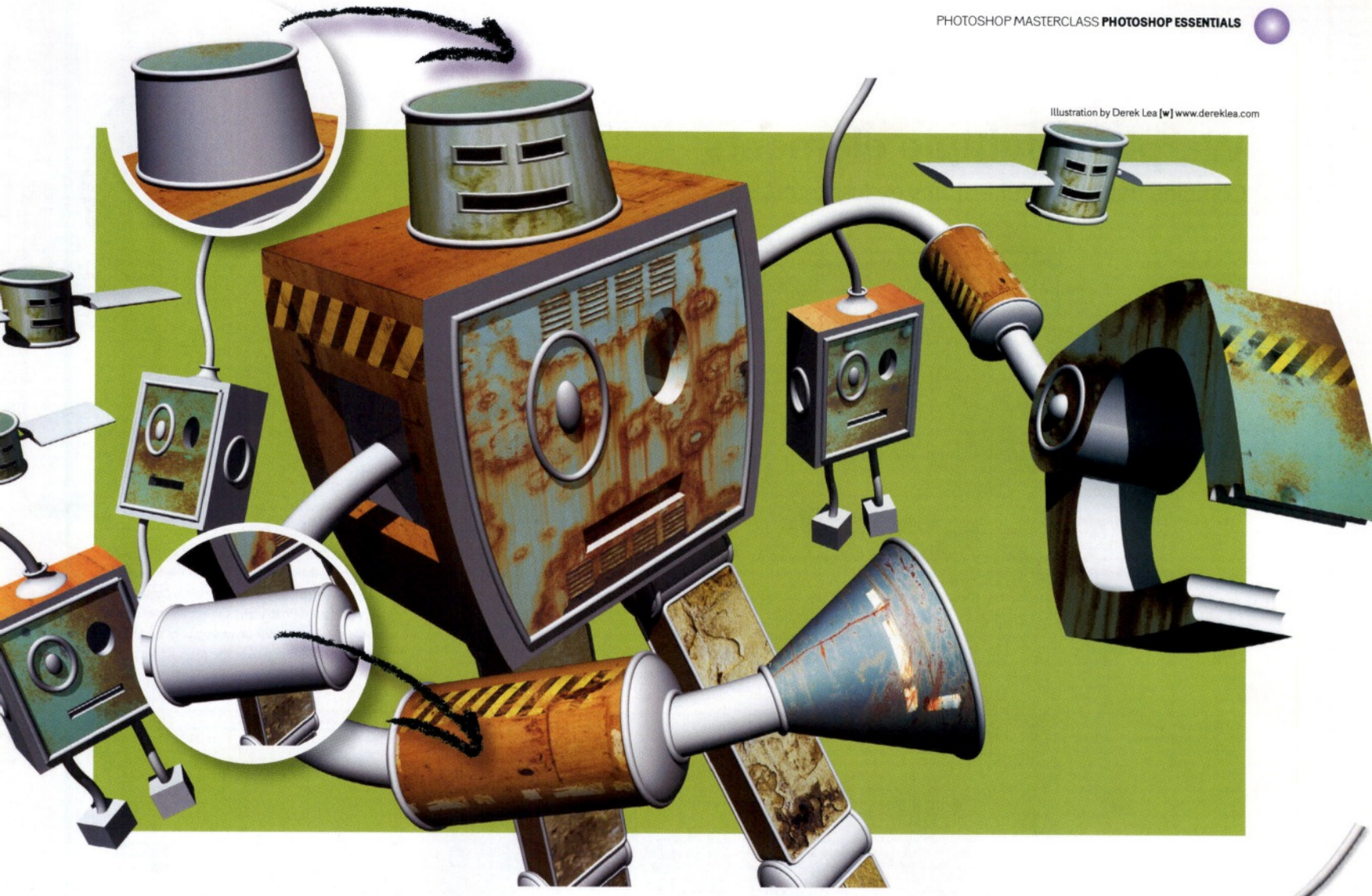


Illustration by Derek Lea [w] www.dereklea.com

Warp your images

We'll continue to turn our flat rendering into a textured masterpiece by incorporating two more features that are exclusive to Photoshop CS2: Smart Objects and the Warp Transform option

We've shown you how to add surface textures and images to flat areas of your finished 3D renderings using the Vanishing Point filter, which enables you to match angles and perspective perfectly. However, not all rendered 3D shapes consist of flat planes – in many instances you'll be confronted with the task of wrapping an image around a curved or cylindrical object in *Photoshop*. But don't worry: *CS2*'s Warp Transform option enables you to do just that.

On the following two pages we'll show you how to alter multiple instances of layer groupings at the same time using another *CS2* feature – Smart Objects. If you didn't complete the first tutorial you'll find a .psd file on the CD that you can use as a starting point.

Warping multiple elements

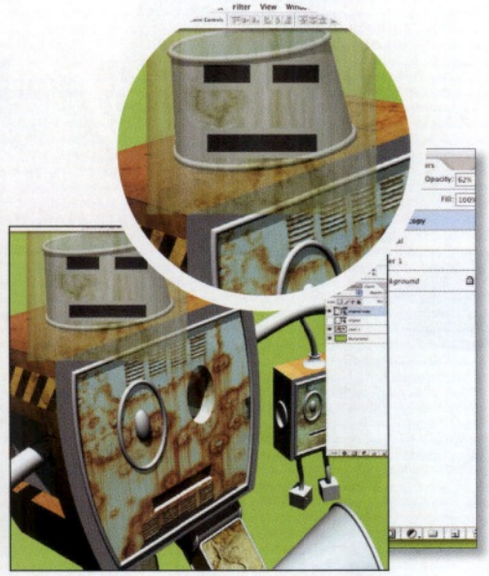
Combine two powerful features exclusive to CS2...

Converting Smart Objects

You can convert any Smart Object in the Layers palette into a layer by choosing Layer > Smart Objects > Convert To Layer, or Layer > Rasterize > Smart Object. Once a Smart Object is converted to a layer, it's immune to any further changes made to the original Smart Object.

1 Open the working.psd and face.psd files from the CD. Target the Background layer in the face.psd file, then hold down the Shift key and click the other two layer thumbnails to select them as well. Drag all of the layers into the working.psd file.

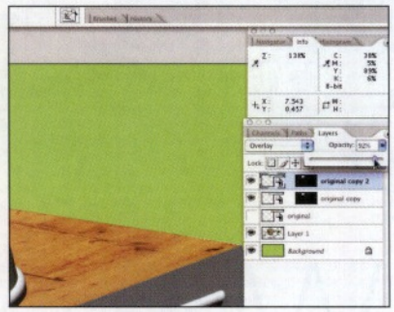
2 Go to Edit > Free Transform, and drag a corner point of the bounding box inwards to reduce the size of the layers. Press Enter to apply the transformation. Choose Layer > Smart Objects > Group Into New Smart Object to bundle the layers into a single Smart Object.



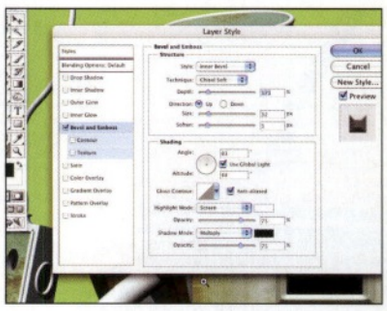
3 Rename the Smart Object layer Original, then duplicate it by dragging it on to the 'Create a new layer' button in the Layers palette. Disable the visibility of the original Smart Object layer and target the duplicate. Reduce the layer's opacity, and use the Move Tool to position it over the main figure's head.

4 Now go to Edit > Transform > Warp. When the mesh appears, drag each corner point inwards until the overall mesh shape begins to match up with the underlying face area. Drag the corner point handles where needed to adjust the curvature of the outer edges of the shape.

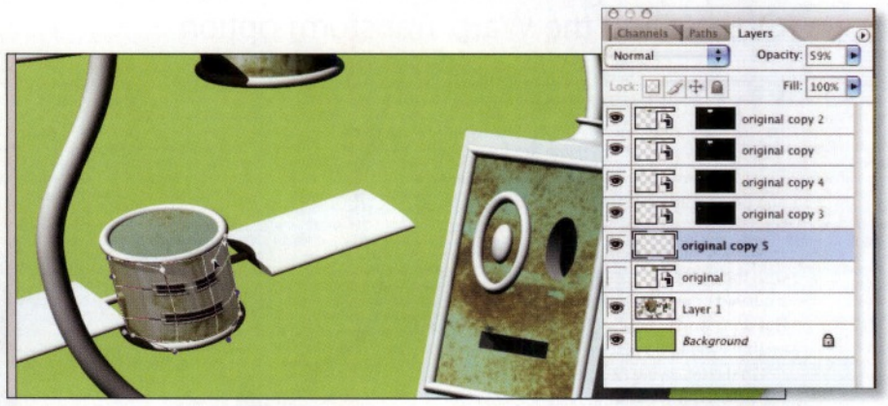
5 You can click on the bounding box segments, areas of mesh or any areas within the mesh, and drag these to adjust specific areas. When you're happy with the results press the Enter key to apply the warp effect. Next, use the Pen Tool to draw a precise closed path around the face area.



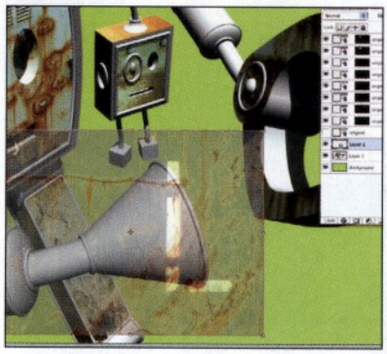
6 Generate a selection from the path, and click the 'Add layer mask' button in the Layers palette to mask the Smart Object layer. Change the blending mode of the layer to Multiply and reduce the Opacity to 35%. Copy the layer, change the blending mode to Overlay and increase the Opacity to 100%.



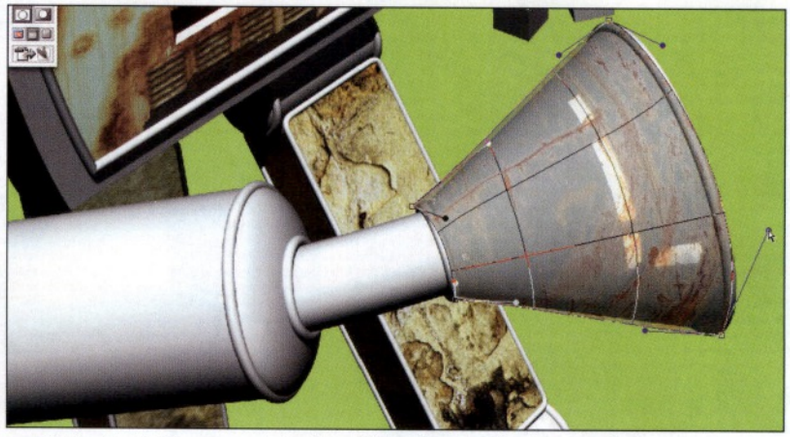
7 In the Layers palette double-click your original Smart Object layer – the one with layer visibility disabled. This will open the Smart Object with all the associated layers intact. Target the layer called Grey, and add a bevel effect via the 'Add a layer style' button at the foot of the Layers palette.



8 When you've added the bevel effect close the window, saving the changes when you're prompted to do so. When you return to the working.psd file you'll notice that the changes you made have affected all the duplicated Smart Object layers. Use the same techniques to add faces to each of the flying cylinders.



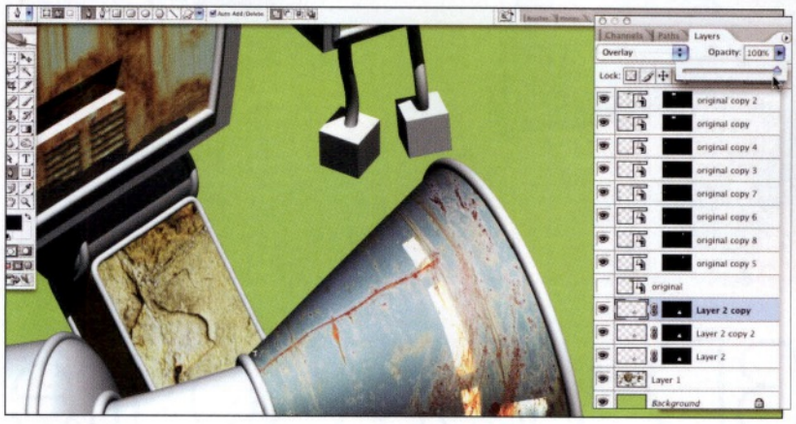
9 Open cone.psd, and use the Move Tool to drag it into the working.psd file as a new layer. Choose Edit > Transform > Warp. Before you warp the layer rotate and resize it, clicking the 'Switch between Free Transform and Warp modes' button in the options bar.



10 You'll notice that the warp mesh has changed into a Free Transform bounding box, enabling you to resize and rotate the layer. When you're finished, click the 'Switch between Free Transform and Warp modes' button again to switch back to the warp mesh so you can edit it. Hit Enter to apply the warp effect.

Vector masks

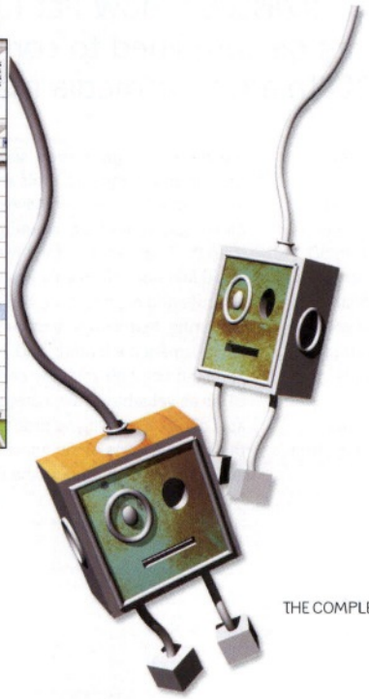
Notice that here we're creating layer masks based on selections generated from paths. A different method, which skips the selection process, is to create vector masks directly from your paths. First, target a path in the Paths palette, then choose Layer > Vector Mask > Current Path. This clips the layer using the targeted path. Note, however, that vector masks can't be edited using the painting tools.



11 Create a path-based selection around the desired area and add a layer mask. Change the blending mode to Linear Burn, reduce Opacity to 20% and duplicate the layer. Change the duplicate layer's blending mode to Color Burn, increase the Opacity to 30% and duplicate it again. Change the blending mode of the new layer to Overlay, and increase the Opacity to 100%.

12 Bring the contents of the arm.psd file into the working.psd file as a new layer. Reduce the opacity, and then use the Warp command to warp and transform the layer until it fits the appropriate area on the model's arm. Now define a selection border with the Pen Tool, and mask the layer.

13 Change the layer's Opacity to 73%, and the blending mode to Multiply. Duplicate the layer, change the duplicate's blending mode to Overlay, and reduce the Opacity to 54%. Repeat the above steps to add the same warped texture to the cylinder on the model's other arm. Don't forget to save your layered file – we haven't finished yet!



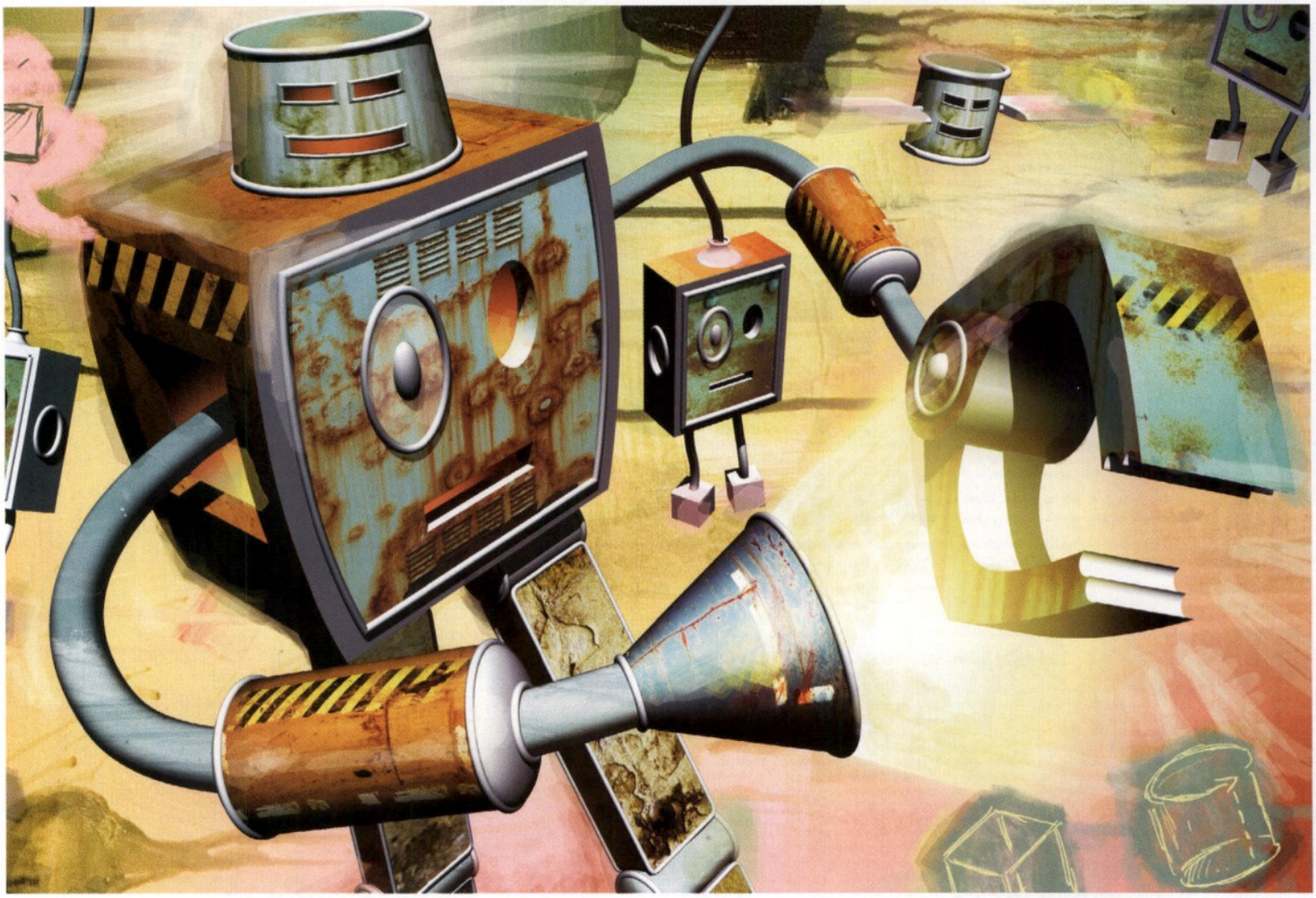


Illustration by Derek Lea [w] www.dereklea.com

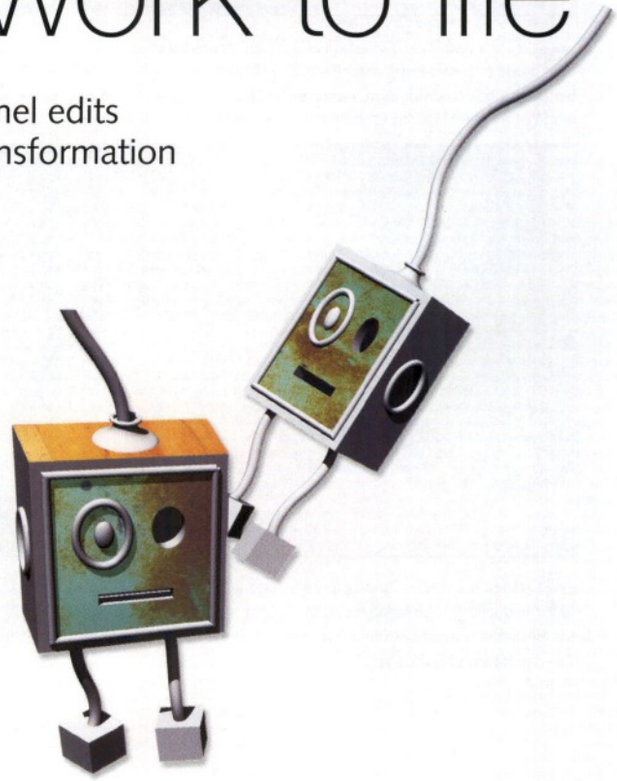
Bring your 3D work to life

In this final part you'll discover how flat textures, channel edits and paint effects can be combined to complete the transformation from untextured 3D to a mixed-media masterpiece

A few years back, after the initial novelty of working in 3D wore off, digital artists began to feel a little limited by the results, and drifted away from 3D techniques in droves. This was often understandable, because 3D software can be difficult to master, especially if you're trying to achieve your own unique look – after all, every artist wants their work to stand out from the crowd.

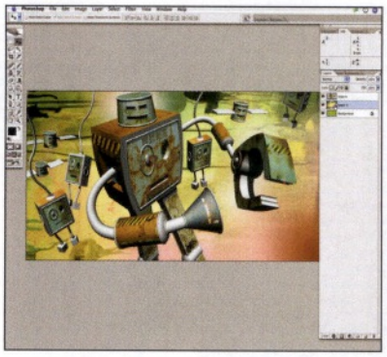
However, the adverse effect of this trend has been that these days 3D is often overlooked as a starting point for illustration. As we've seen, some textured images and *Photoshop* tools are all that are required to transcend average 3D art, and create something beautiful.

In the final section of our masterclass you'll find out how to give your illustration a tactile and original feel. You'll see how colouring, texturing and other techniques complement each other, and, hopefully, at the end of it all you'll be convinced that 3D is as valuable a raw material as a digital photo. If you didn't complete the first two parts of the tutorial a starter file has been provided on the CD.



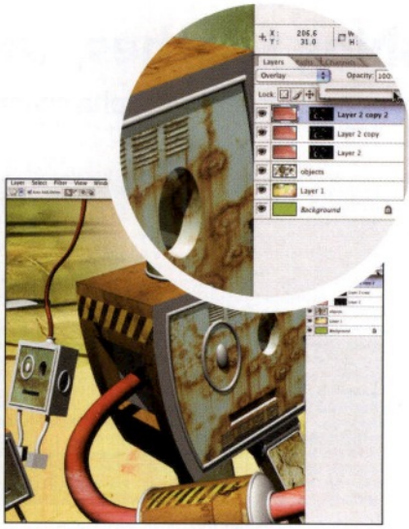
The finishing touches

Use paths and the Gradient Tool to add detail...



1 Open your saved file, or starterfile.psd from the CD. Next, open the bkd.tif file, and use the Move Tool to drag it into starterfile.psd as a new layer. Position the layer above the Background layer in the Layers palette, then select the Pen Tool.

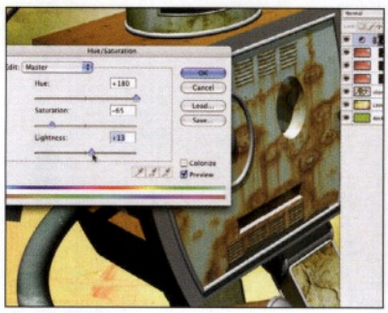
2 Use the Pen Tool to draw a series of closed path components that surround untextured areas of the main robot, as well as the cables that suspend the others. Generate a selection from the new path using the Paths palette menu option. Open paint.tif from the CD. Select All and Copy.



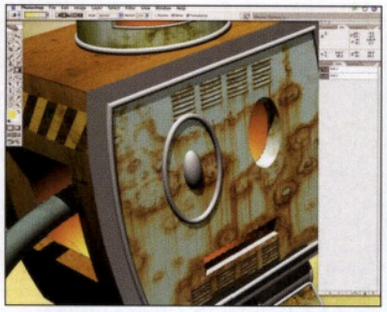
3 Target the top layer in the Layers palette and choose Edit > Paste Into. Duplicate the new masked layer, and reduce the Opacity of the duplicate layer to 32%. Duplicate this new layer, change the blending mode to Overlay, and increase the Opacity to 100%.

Using alpha channels

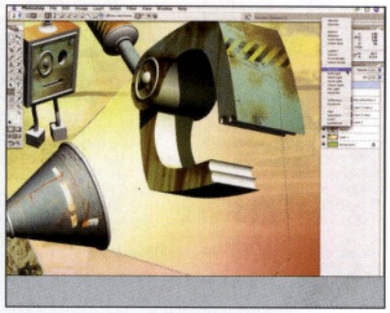
Alpha channels can be created in the Channels palette, either by selecting New Channel from the palette menu or by clicking the 'Create new channel' button at the foot of the palette. You can generate a selection from a channel by Ctrl/Cmnd+clicking the channel's thumbnail. You can also generate a selection from a channel by selecting it in the Channels palette and clicking the 'Load channel as selection' button at the foot of the palette.



4 Again, generate a selection from the path you created previously. Then create a Hue/Saturation adjustment layer via the button at the foot of the Layers palette. Increase the Hue to 180, reduce the Saturation to -65, and increase the Lightness to 13.



5 Use the Pen Tool to create a series of path components surrounding the holes in the main robot. Generate a selection from the path, create a new layer, and select the Gradient Tool. Use the Foreground to Transparent preset and Radial gradient type to introduce a variety of coloured gradients into the selected areas. This will add variety and a sense of realism to your creation.



6 Create a new layer, and use the Pen Tool to draw a light beam shape extending from the character's funnel hand. Generate a selection from the path, and use the Gradient Tool to draw a yellow and white Radial gradient in the selection. Change the layer's blending mode to Overlay.

7 Deselect, and then apply the Gaussian Blur filter. Duplicate the layer and change the blending mode to Screen. Create another layer with a Screen blending mode, and reduce the Opacity to 24%. Use the Pen Tool to draw a path component to surround the inside of the eye.

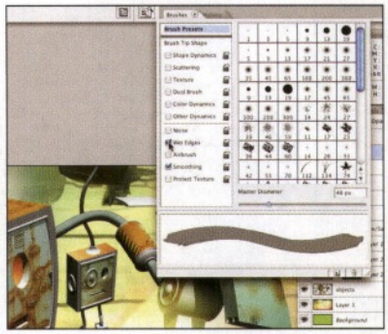
8 Click the 'Subtract from path area' button in the options bar, and then carefully draw a second path component around the main pupil shape. Generate a selection from the new compound path in the Paths palette, and fill the selection on the new Screen layer with white. Next, create a new layer, and deactivate the current selection.

The finishing touches, continued

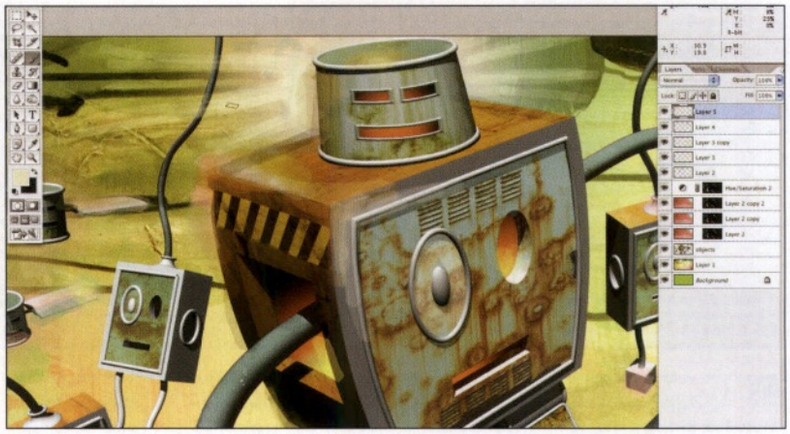
Add more detail using brushes and alpha channels...

Changing colour fills

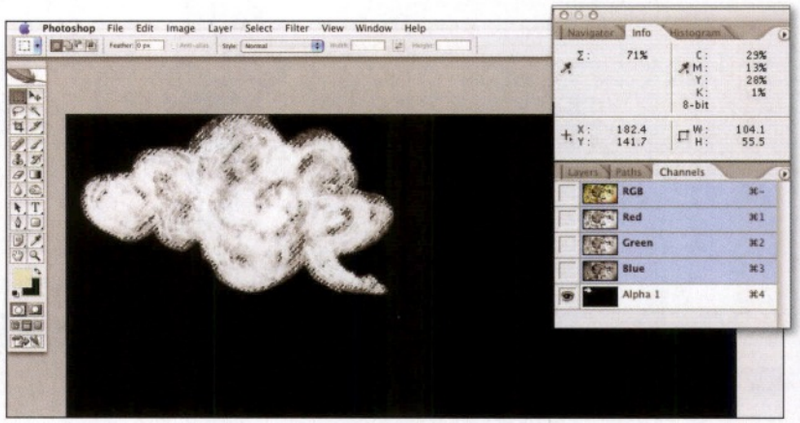
Foreground and background colours can be used to fill your active selections or the current layer. Hit Alt/Option+Delete to fill a selection or layer with the current foreground colour; to fill with the current background colour, hit Ctrl/Cmnd+Delete. Changing the foreground or background colour is as simple as clicking on the relevant swatch in the toolbox and selecting a colour from the Color Picker.



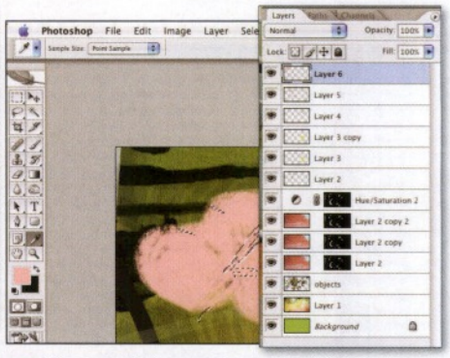
9 Select the Brush Tool, open the Brushes palette and scroll through the list of presets until you begin to see the chalk, oil and pastel tip presets. Select one, and enable the Wet Edges and Smoothing options. Set the brush opacity to 50%.



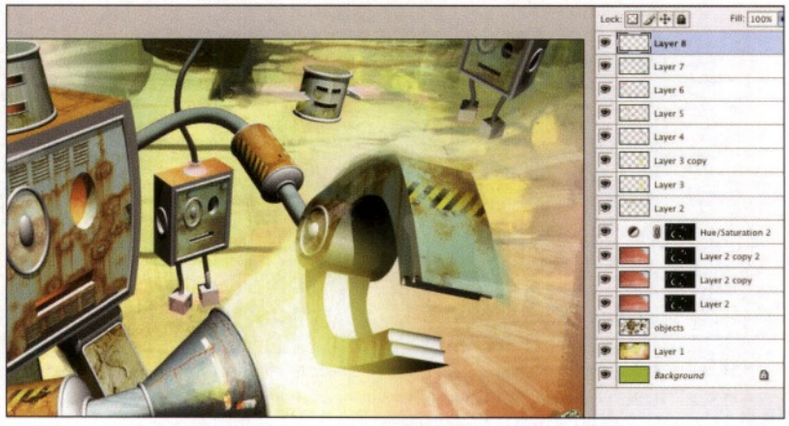
10 Paint brush strokes in the new layer, building them up in areas where you want effects to be more pronounced. You can sample colours from the background, as well as choosing new ones from the Color Picker. For a more natural effect, alter the opacity and size of the brush stroke as you go.



11 Open the bubble.tif file from the CD. Select All and Copy. Return to the main file and create a new alpha channel in the Channels palette. Paste the copied black and white image into the new channel, and position it in the upper-left corner. Generate a selection from the channel, and then create a new layer.



12 Choose a pink foreground colour, and fill the active selection on the new layer. Deselect, and open the shapes.tif file. Select and Copy the image. Again, create a new channel in your working file, and paste the copied image into it. Position it at the upper-left, and generate a selection from the channel.



13 Create a new layer, and fill the active selection with a dark green colour. Deactivate the selection, and then use the same method to create alpha-channel-based selections from the bits.tif and pieces.tif files, filling the selections with different colours on new layers at the bottom-right of the image. ■

Tutorial [illustration] Derek Lea [w] www.dereklea.com

Photoshop character faces

Regardless of their final destinations, the faces of your characters should be designed to facilitate changing emotions and diverse facial expressions. **Derek Lea** shows you how >

When you're building faces for your characters it's important to think a few steps ahead. It's one thing to put together a visually pleasing design, but planning for multiple uses of the character and future changes involves different considerations and techniques, and it's these we're going to focus on here. *Photoshop* is host to numerous tools for creating flexible artwork, and one of the most useful features of recent versions of *Photoshop* is shape layers.

Shape layers enable you to build up stacks of resolution-independent shapes that are absolutely perfect for creating faces. You can adjust their size and otherwise alter them at any stage without any loss of image quality. The available preset shapes are excellent building blocks for features, and the Pen Tool gives you the flexibility to create any custom shape you desire. And the flexibility of your shape layers doesn't end there.

When you select more than one shape on a layer, you'll notice a selection of buttons in the options bar that enable you to create compound shapes. You can add, subtract, intersect, and exclude shapes, as well as choosing from a plethora of alignment options to position your facial features exactly where you want them.

While shape layers enable you to create crisp and sharp vector-based faces, if it's something a little more natural and tactile-looking that you're after then you needn't look any further than the Brush Tool. *Photoshop's* brushes enable you to paint faces which, while not resolution-independent, will convey the feeling and style of traditional drawing techniques. A quick look at the Brushes palette reveals a vast amount of options for customising your brush strokes, enabling you to give your painted faces a unique style of their own.

Regardless of whether you're creating sharp, crisp faces with shape layers, or tactile and painterly faces with the Brush Tool, the use of layers is essential for future flexibility. By separating each facial element on its own layer, you aren't limiting yourself when it comes to altering your face later on. Layers can be switched on and off as required so that you can choose from different mouths or eyes for example, enabling you to create a number of different expressions. And layers can also be linked (or 'grouped' in *CS2*), so that multiple elements can be moved, rotated or scaled together. No matter what style of face you're creating, when it comes to flexibility and versatility, layers are the absolute key to success.

Expertise provided by Derek Lea, an award-winning illustrator based in Toronto. You can see more of Derek's work at **[w]** www.dereklea.com.

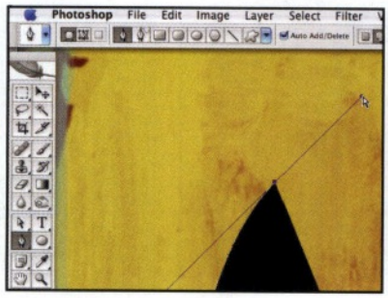
We've included a layered *Photoshop* file on the CD containing the entire background area seen here. A selection of custom shape layers are also included in the file for your reference. You'll find the file in the Tutorial Files\Photoshop Character Faces folder.

Part 1: Working with shapes

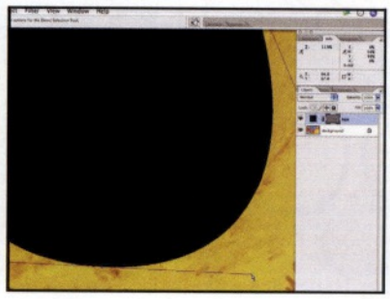
Starting with vector-based shape layers is the key to unlimited flexibility...

Shape layer colour

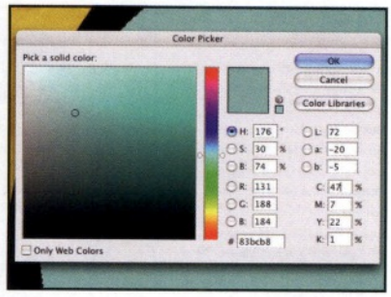
You can change a shape layer's colour in the tool options bar, but there are a couple of other ways of doing the same thing. One way is to double-click a shape layer in the Layers palette, which opens the Color Picker. Alternatively, you can target the shape layer, press Alt/Option and hit Delete to fill the layer with the current foreground colour.



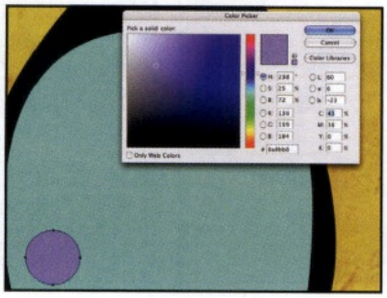
1 Open starter file.psd from the Faces folder on the CD. Select the Pen Tool, and zoom in close on a section of the background. Click the Shape layers button at the left of the tool options bar, then click and drag to begin drawing a shape.



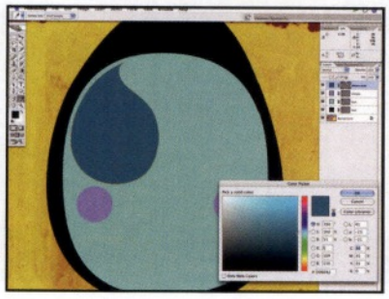
2 When you begin to draw, a new shape layer is created in the Layers palette. Continue drawing and return to your starting point to close the shape. Once the shape is closed, use the Direct Selection Tool to select anchor points, and drag them to edit the shape.



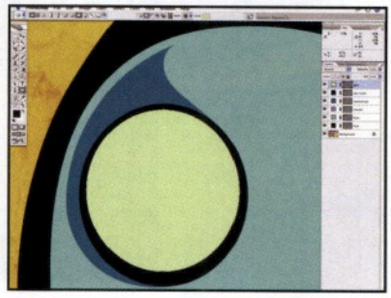
3 Select the Ellipse shape tool, and click and drag inside the previous shape to create a new ellipse shape layer. Click the colour swatch in the tool options bar to open the Color Picker, and select a blue colour for the new shape layer.



4 Use the Direct Selection Tool to select anchor points on the ellipse, and edit the curves and line segments to make the shape more rectangular. Next use the Ellipse Tool to draw a circle shape layer, and change the colour of this shape to purple.



5 Click on the new circle shape with the Path Selection Tool, then click and drag to the right while holding down the Alt/Option key to create a duplicate shape on the same layer. Use the Pen Tool to draw a new custom shape layer that will surround the eye, and alter its colour.



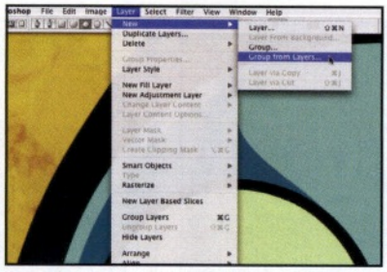
6 Use these techniques to build up two elliptical eye shapes on separate layers and edit their fill colours. As long as the 'Create new shape layer' option is enabled in the tool options bar, a new layer will be created each time you make a shape using any shape tool.

Part 2: Using groups

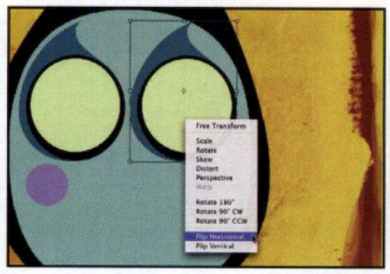
You can duplicate and edit sets of shape layers by grouping them...

Staying organised

When you're building up large piles of layers it's always a good idea to stay organised. Double-clicking on a layer's name will highlight it, allowing you to give it a name that's indicative of its content. Choosing Layer Properties from the Layers palette menu when a layer is targeted will enable you to colour-code your layers as well as renaming them.



1 Link the three shape layers that make up the eye area and go to Layer > New > Layer Set From Linked, or select the option from the palette menu. In CS2, click on the first layer and then Ctrl/Cmnd-click the other two, and with all three shape layers selected go to Layer > New > Group from Layers to group them.



2 Drag the group on to the 'Create a new layer' button in the Layers palette to duplicate it, and use the Move Tool to drag the duplicate group to the other half of the face. Hit Ctrl/Cmnd+T to activate the Free Transform bounding box, and Right-click (PC), Ctrl-click (Mac) inside the box to open the context menu.

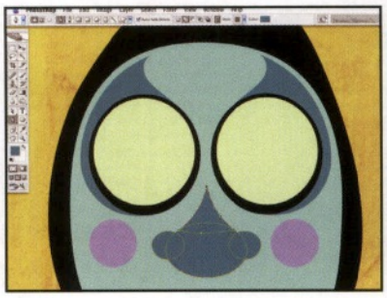
3 Choose Flip Horizontal from the menu, and hit Enter to apply the transformation – this is an easy way to make a mirrored copy of grouped shape layers. Use the Ellipse Tool to draw a shape layer for the nose, and change the colour to darker blue.

Part 3: Shape areas

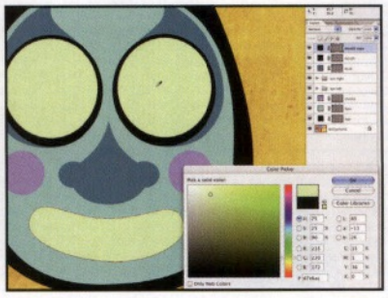
Create compound shapes using the shape area options in the tool options bar...

Custom shapes

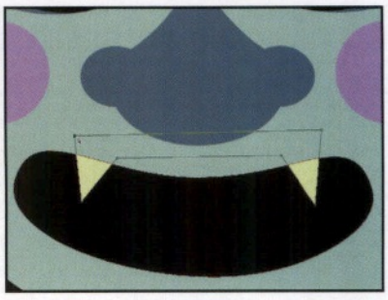
When you've spent some time creating a shape with the Pen Tool or by editing a preset shape, you may wish to save it for use later on. To do this, simply select the shape with the Path Selection Tool and choose Define Custom Shape from the Edit menu. You can now name the shape and save it. The next time you select the Custom Shape Tool, your custom shape will appear in the list of presets available in the tool options bar.



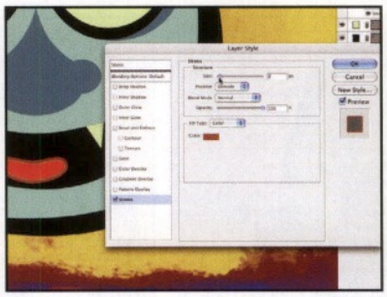
1 Click the 'Add to shape area' button in the tool options bar, and create two more ellipses on either side of the larger ellipse within the same shape layer. Then switch to the Pen Tool and, with the 'Add to shape area' option enabled, draw the bridge of the nose.



2 Click the 'Create new shape layer' button, and draw a mouth. Change the colour to black, and duplicate the layer by dragging it on to the 'Create a new layer' button in the Layers palette. Change the duplicate shape layer's colour – we've used the same pale green as for the 'whites' of the eyes.

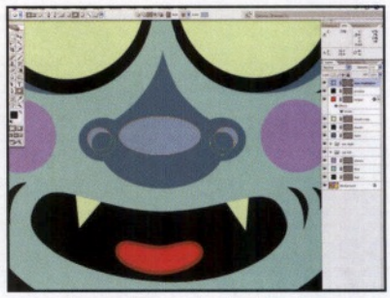


3 Enable the 'Intersect shape areas' option, and use the Pen Tool to draw a polygonal shape that has two points overlapping the mouth. The only visible areas of the shape will be where the two shapes (teeth and mouth) intersect.



4 Use the Pen Tool, with the 'Create new shape layer' option enabled, to draw a red tongue shape on a new shape layer. Add a darker red stroke around the tongue by clicking the 'Add a layer style' button at the foot of the Layers palette and selecting the Stroke option from the menu.

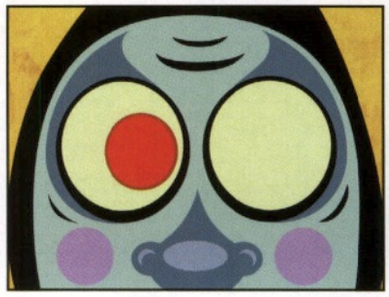
5 Next, use the Pen Tool to draw a facial wrinkle shape on another new shape layer. Change the colour of the layer to black, then enable the 'Add to shape area' option and draw additional wrinkle shapes within the same layer.



6 Enable the 'Create new shape layer' option, and use the Ellipse Tool to draw a light blue ellipse on the nose. Enable the 'Add to shape area' option and draw a couple of smaller ellipses. Then enable the 'Subtract from shape area' option and create two ellipses that overlap the previous two.

Part 4: Moving grouped shapes

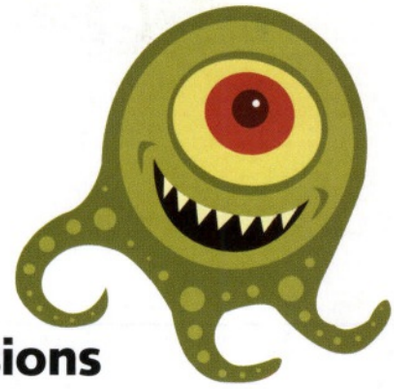
If you link layer sets or groups, you can move facial features in unison...



1 With the 'Create new shape layer' option enabled, use the Ellipse Tool to draw a red retina shape layer on top of an eye. Hold down the Alt/Option key, and drag the stroke effect from the tongue layer on to the new retina layer in the Layers palette – this adds the same effect to the new layer.

2 Enable the 'Create new shape layer' option, and draw a black elliptical shape for the pupil. Then select the retina and pupil shape layers in the Layers palette and link/group them. Duplicate the set/group, and use the Move Tool to position the duplicate set/group over the other eye.

3 Link the two layer sets in the Layers palette (in *CS2* Ctrl/Cmnd-click the groups and then click the 'Link layers' button at the foot of the palette. Now, click and drag either set/group with the Move Tool and the other will follow, so your eyes move in unison.



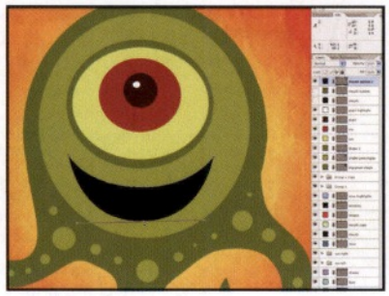
Part 5: Changing expressions

Different facial features on separate layers can convey a variety of emotions...

Combining shapes

The shape area functions in the tool options bar provide nearly everything you need to create diverse and unique composite shapes. However, there may be instances where you'd prefer that the visible results were indicative of one actual shape, or perhaps you wish to perform different shape area functions on the resulting shape. In *CS2* you can click on the Combine button in the tool options bar to change the group of shapes into a single, editable shape.

1 This octopus has a face that was created in the same manner as our previous creature's. Although he only has one eye, the face is capable of expressing more than one emotion. At the moment, the mouth is expressing a feeling of surprise.



2 The first step in changing his expression is to switch off the visibility of the two layers that make up the mouth. Next, using the Pen Tool and with the 'Create new shape layer' option enabled, create a black smiling mouth shape.

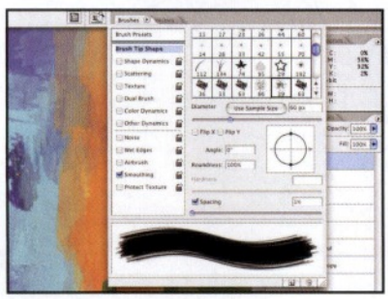
3 Use the compound shape options to create a teeth shape layer, using the same methods as in Part 3, step 3. Also create some facial line shapes on another layer. Switching his expression from smiling to surprise is as simple as enabling and disabling the visibility of the relevant layers.

Part 6: Painted faces

Brushes enable you to create pixel-based faces with a more tactile feel...

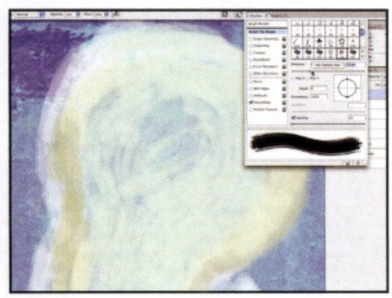
Blending modes

When you're working with shapes and shape layers it's easy to fall victim to vector tunnel vision. At times like this, when your entire image seems to be all about vectors and curves, try to remember that you're still working within *Photoshop*, and that even though you're creating shape layers you still have a diverse set of blending modes to work with. This means that you can deviate from the norm when compositing with standard shapes.

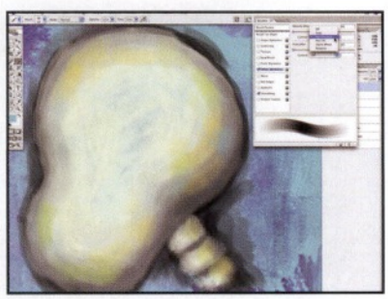


1 You'll need to click the 'Create a new layer button' in the Layers palette, because paint tools don't automatically create new layers like shape layers do. With your new layer targeted, select the Brush Tool and open the Brushes palette. Go to the Brush Tip Shape section.

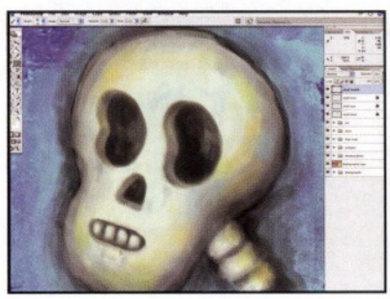
2 The list of presets includes a number of nice tactile brush tips such as dry brush, chalk and pastel options. Choose any of these presets, adjust the size of the brush, alter the Angle setting and set the Spacing to 1%. Set Opacity to 50% in the options bar and begin to paint in your new layer.



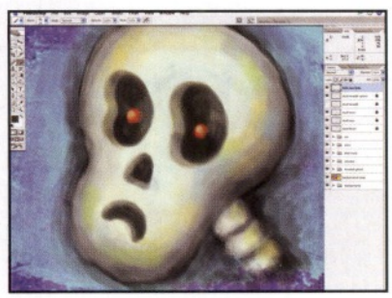
3 Use the Eyedropper Tool to sample colours, or choose new colours using the Color Picker. Continue to paint a series of strokes on this layer at varying opacities and in different shades to create the base for the character's face. Alter the brush diameter in the Brushes palette as required.



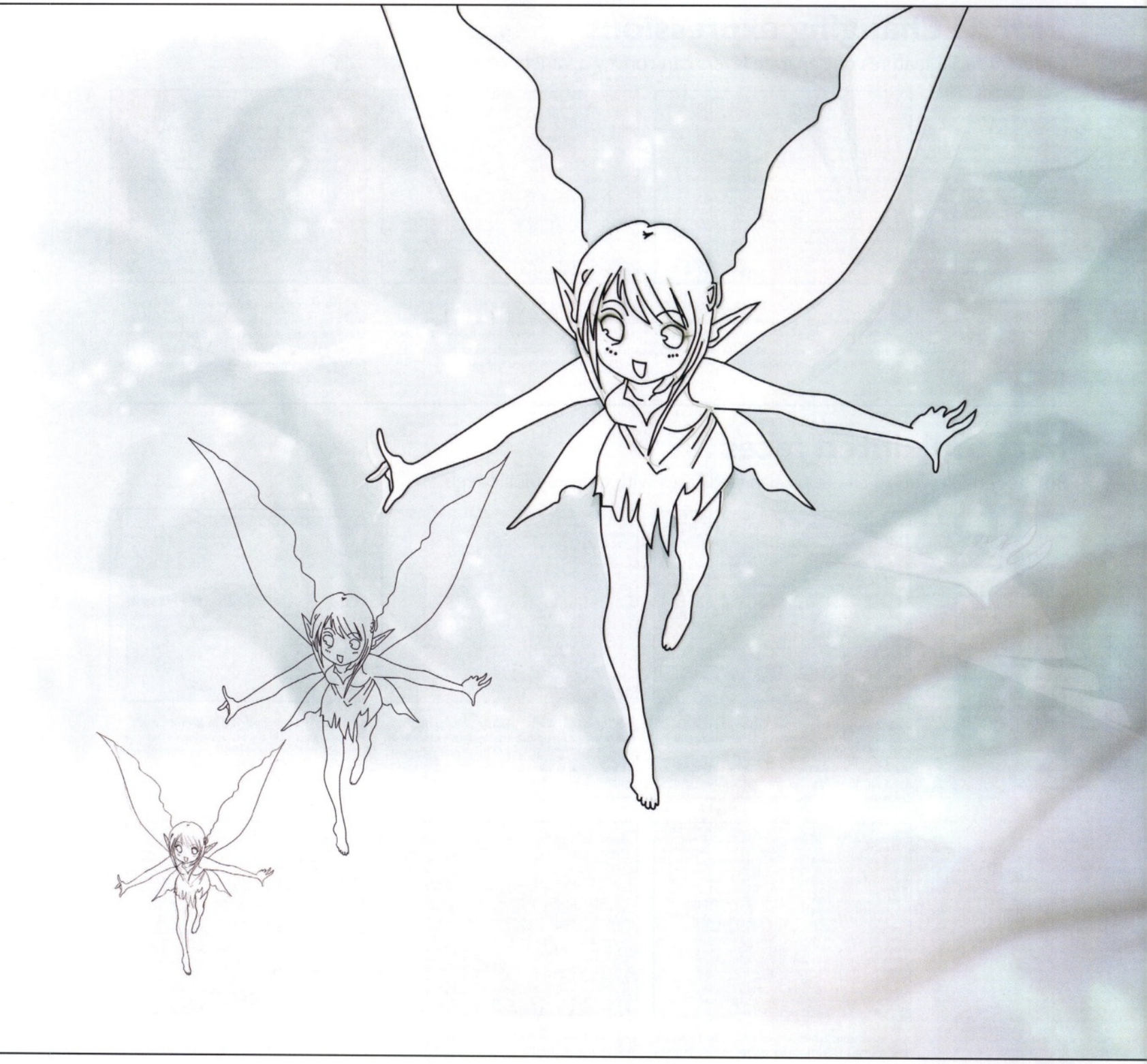
4 For a smooth blending effect, the best method is to gradually build up strokes using a very low Opacity setting. If you're using a pressure-sensitive tablet and stylus, enable the Pen Pressure opacity control option in the Other Dynamics section of the Brushes palette.



5 When you've finished painting the base layer for the face enable the 'Lock all' option in the Layers palette. This protects the layer from accidental editing, but still allows you to enable or disable the visibility. Create each facial feature on a new layer, and lock each individual layer.



6 Keeping the different face elements on separate layers means the layers can be switched on and off as required. This enables us to easily substitute alternative features, as we did previously with the octopus. ■



Tutorial

[illustration] Melissa Somerville **[e]** messachan@hotmail.com

Draw figures in an anime style

Over the next four pages, we're going to cover the basics of drawing your own unique character in an anime style, incorporating touches to make the character part of a fantasy world. In this case we're creating a fairy; since fairies have many human-like qualities, it should be easy to incorporate the anime style into the drawing. In addition, we'll show you how to scan your images properly using your home scanner. This means learning about resolution, preparing your image in Adobe *Photoshop* and finding the best ways to ink your sketch to give it a smooth, clean look while beginning to include some colouring. General tips will also be given throughout the tutorial to help you do the best drawing job possible.

Expertise provided by Melissa Somerville. Melissa creates character designs for small projects between friends, and computer-coloured anime-style artwork. You can contact her at **[e]** messachan@hotmail.com.

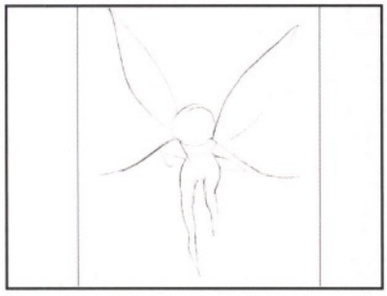
All the components needed to complete this tutorial can be found on the CD, in the Tutorial files\Draw figures in an anime style folder.

Part 1: Creating the character

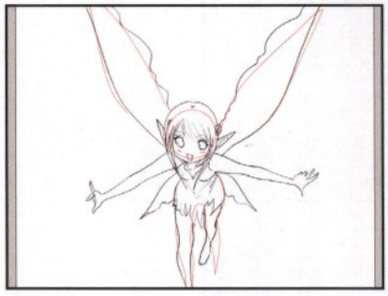
Begin your composition by drawing your character on paper...

Choosing characteristics

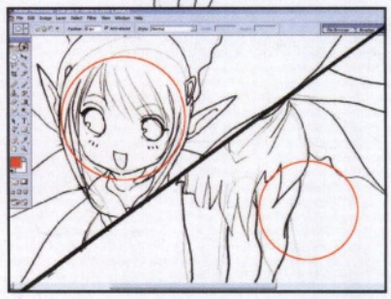
Will your character have long hair? Short hair? Freckles? These details are important, so think carefully, and use different combinations to add to your character. Don't overcrowd your figure with too many characteristics at this stage, though, because a lot of their personality will come through when the colour is added.



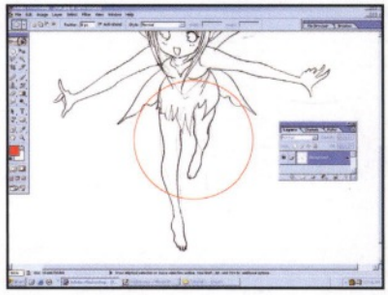
1 Let's start with a basic sketch. This is where you'll plan out the pose of the character. Since we're drawing a fairy, we'll give her a light and feathery pose, along with a plan for two sets of wings which will be added later. (Note that while you'll be using a pencil and paper, we're using Photoshop screen grabs to illustrate the process.)



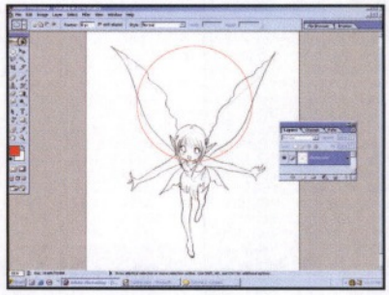
2 The next step is to add the lines of the character, and then begin to add some extras to help create originality. In the screenshot above, you'll see where we've outlined the 'plan lines' in red.



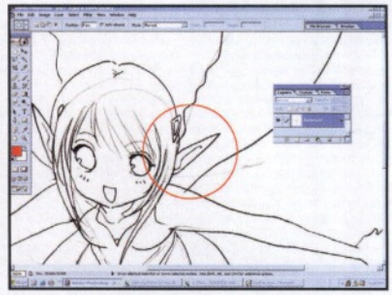
3 Now you need to incorporate the anime style. One example of this is to make the eyes larger than they would normally be. You should also use smooth, cartoon-like lines. By exaggerating the fairy's proportions a bit, and altering the style of drawing, you'll soon give her a slight anime style.



4 Next, focus on point of view and perspective. The pose of the character means that her left leg is further back than her right one, so draw the left leg slightly smaller.



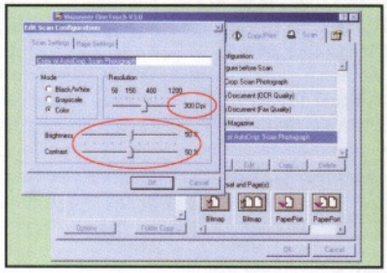
5 Wings can be added to any fantasy creature to make them unique. Simply draw a curve for the base, and then frill the edges of the other side with smaller, quicker curves.



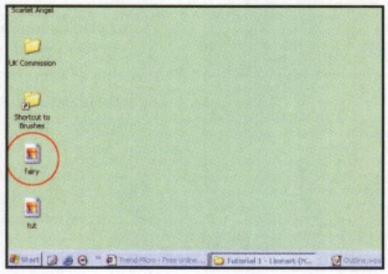
6 Don't forget the ears. If you're focusing on fairies, they tend to have characteristics such as pointy ears. You should also give her thinner limbs to accentuate her frailness.

Part 2: Scanning your image

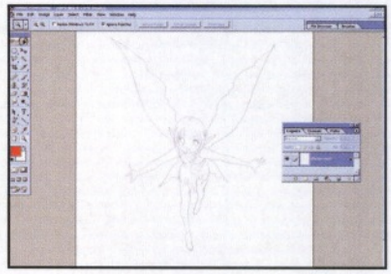
Find out the best way of transferring your drawing on to your computer...



1 Don't worry about your sketch being messy, because you're now going to scan it, and tidy it up in *Photoshop*. In your scanner settings, set the dpi to 300, and the Brightness/Contrast to 50/50. Select Colour mode.



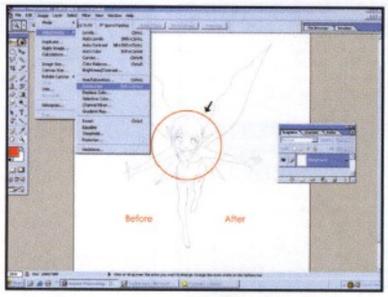
2 Now scan the picture and move the file on to your desktop, so you can reach it easily. Name your file, and make sure it's in JPEG format.



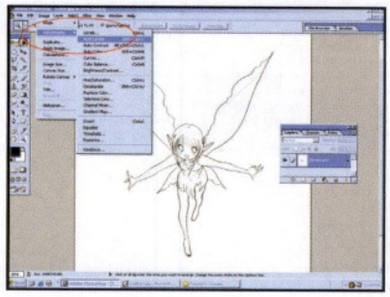
3 Open your file in *Photoshop*. Whatever you do, don't resize the image; keeping the image at a larger size will make inking easier. The process is long, but the results can be wonderful if you're patient.

Part 3: Preparing your scan

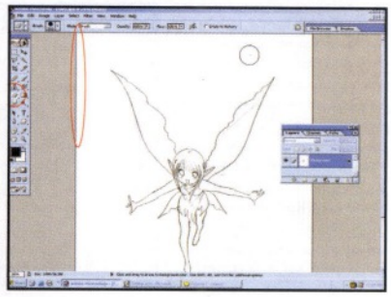
Clean up the image in *Photoshop* before inking the lines...



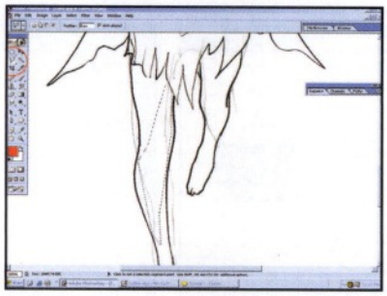
1 At first glance, the line art is messy and light. Go to Image > Adjustments > Desaturate to completely clear out any colour in your image.



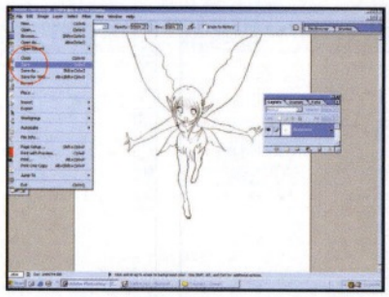
2 Next, go to Image > Adjustments > Auto Levels. This will darken your lines considerably. If your scanned image had a grey background, try using the Levels command instead. This process will also accentuate the 'plan lines' you started out with.



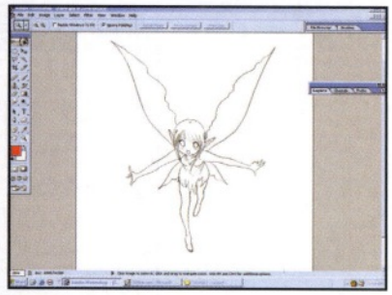
3 It's time to clean up the image. Select the Eraser Tool, hit D so that the tool erases to the white background colour, and begin erasing any visible messy lines at 50 or 100 per cent zoom. If you make a mistake, press Ctrl/Cmnd+Z to undo.



4 A quick way to erase large areas of lines is to use the Polygonal Lasso Tool. Draw a selection around the lines you wish to erase, then hit Delete.



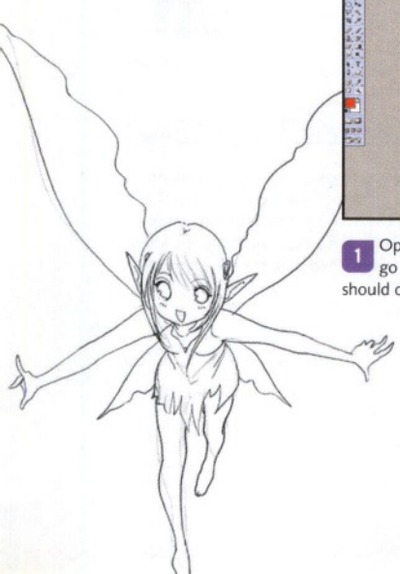
5 It may take some time to clean up the entire image, so be patient – you'll be rewarded in the end. Also make sure you save often, so that you don't lose any of this time-consuming work.

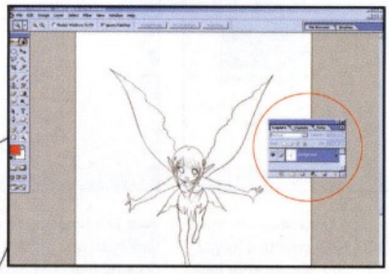


6 This is what the image should look like at this stage. If you're not satisfied, keep going until it's perfect – practice and patience is the only way to improve your results.

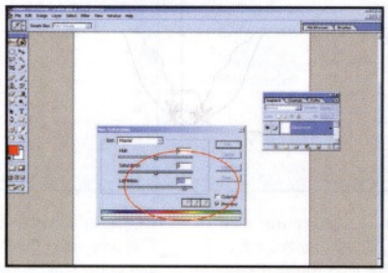
Part 4: Inking

Now you need to start adding colour to your smooth lines...





1 Open the Layers palette (if you can't see it go to Window > Layers). At this stage you should only have one layer: Background.



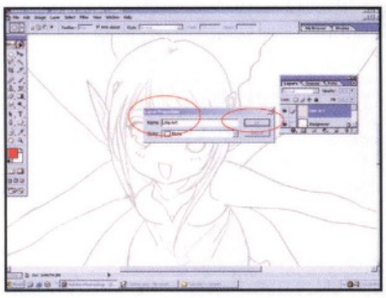
2 Go to Image > Adjustments > Hue/Saturation. Move the Lightness slider to the right until the image is a fairly light shade of grey; by making the lines light, they won't show through as much. Click OK, and open your Layers palette again.

3 Create a new layer by clicking the button at the foot of the Layers palette, or by going to Layer > New > Layer. Make sure you're working on your image at 100 per cent zoom.

Inking, continued

Pen Tool techniques

The Pen Tool is a wonderful tool if you know what you're doing with it, and you can add anchor points to your lines to create more detail. It can be a time-consuming process, but it's very effective in the long run. Clicking and dragging to create curves is a bit tricky to start with, but you'll get the hang of it with practice; you can change where the line curves, and by how much, by dragging in different directions.



4 Rename your Layer 1 by right-clicking/Ctrl-clicking and selecting Layer Properties. Type in the new name, Line Art, and click OK. When you save, make sure your file changes to the *Photoshop* PSD format.

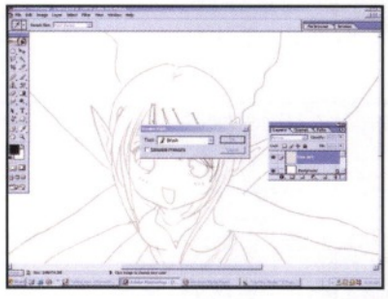
5 Select the Pen Tool, and make sure the Paths option is selected in the options bar – it's the middle of the three buttons at the right of the bar.

6 Start tracing the lines in the drawing by clicking on some points – we're starting on the head. Don't worry about following curves for now, but don't add too many points at once.

7 Select the Add Anchor Point Tool (it's grouped with the Pen Tool in the toolbox) and click in the middle of the line to place an anchor point. Click on the point, and drag the line to match the sketch underneath. See how smooth the curve of the line is? It doesn't have to be perfect, but try to make it fit pretty closely.

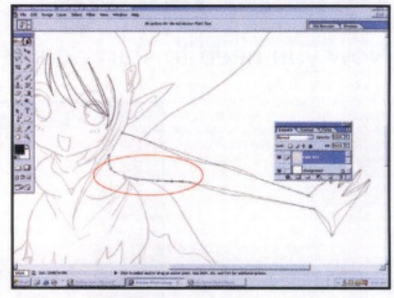
8 Repeat the last step with the rest of the lines. When you're finished, hit D on your keyboard to make sure your foreground and background colours are black and white respectively.

9 Select the Brush Tool, and open the Brush Preset picker by clicking on the brush preview in the options bar. If the brushes aren't the default set, click the arrow at the top-right of the picker and choose Reset Brushes from the menu.



10 Select the Hard Round 3-pixel brush, then switch back to the Add Anchor Point Tool. Hover your cursor over the lines you've drawn, right-click/Ctrl-click and select Stroke Path from the context menu. Select Brush from the Tool menu and click OK.

11 Right-click/Ctrl-click on a line again, and this time select Delete Path. Now choose a longer part of the body, such as the arm. Create your basic lines with the Pen Tool as before, and add anchor points to the lines.



12 This time you're going to have to use more than one point to fit the lines to your sketch, because one point won't normally be enough to create such a large curve. Add another point where you think it's needed, and drag the line to match the sketched line.

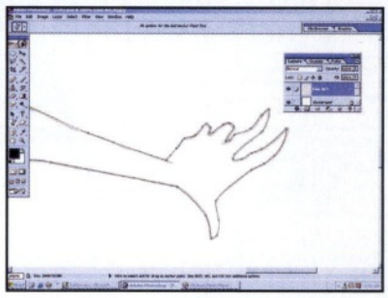
Part 5: Perfecting your lines

Finish inking the rest of the lines, and merge all your layers...

Using Hue/Saturation

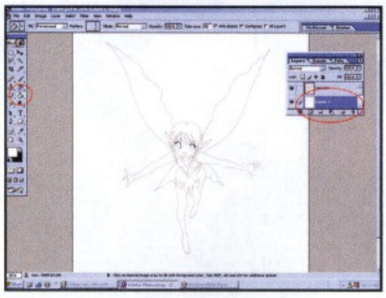
In the Hue/Saturation dialog, hue is the colour you want to use, and saturation controls how strong the colour is. The further the Saturation slider is dragged to the left, the paler the colour will be; the further right it's dragged, the deeper the colour will appear. Lightness is the shade or highlight of the colour; with black you'll normally have to drag the slider to the right to see your colours.

1 Finish the rest of the basic lines, adding anchor points where they're needed. If you're starting with the arm, when you reach the fingers stop and go on to the next step.

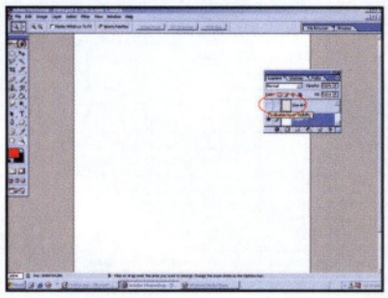


2 Now you need to ink some fingers. As fingers are a lot smaller, and have more intricate curves, you'll be using a lot of anchor points. Again, the path lines need to follow the sketched lines quite closely.

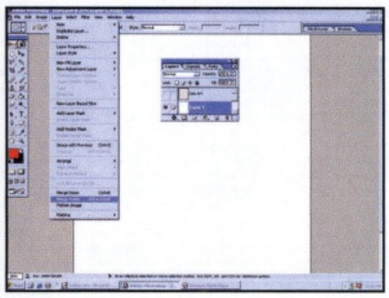
3 Right-click/Ctrl-click on a line, choose Stroke to stroke your path, then right-click/Ctrl-click again and delete the path. Repeat the line drawing and stroking steps throughout the entire sketch. This will take a while, but it'll be wort h it.



4 When you've finished, add a new layer between the Background layer and the Line Art layer. With the background colour set to white, go to Edit > Fill, and select Background Color from the Use: menu to fill the layer with white and hide the sketch lines underneath (you could also use the Paint Bucket Tool).



5 Next, go to the Layers palette and click the eye icon next to the Line Art layer to temporarily hide your inked lines.

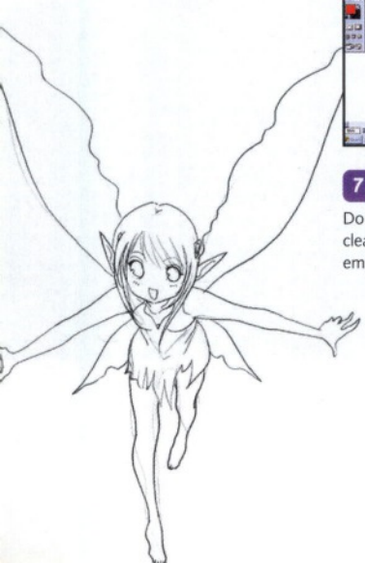


6 Go to Layer > Merge Visible – this will flatten all the layers that aren't hidden, leaving you with the Background layer as a simple white layer, with your hidden line art layer on top.

7 Click the visibility box next to your Line Art layer to make it appear again. Is it satisfactory? Do the lines seem smooth enough? The Pen Tool's clean lines will make the colouring process that we'll embark on over the page a lot easier.

8 Make sure your Line Art layer is selected, then go to Image > Adjustments > Hue/Saturation. Click the Colourize and Preview boxes, and adjust the sliders to add a tint to your line art.

9 Here we've chosen a teal-green hue – you can change the colour later on if you wish. The sketch is now finished, and ready for colouring – we'll show you how in the next tutorial. ■



Tutorial

[illustration] Melissa Somerville **[e]** messachan@hotmail.com

Colour your fantasy figures

Having drawn and inked your fantasy figure in the previous tutorial you now need to turn your attention to colouring it. We'll show you how to do this using colour fills and brushes on multiple layers, defining areas to be coloured with selection tools such as the Polygonal Lasso and Elliptical Marquee.

We'll also show you how to cell-shade (colour using hard-edged shading techniques) your character, and create a detailed background to situate your fantasy character in its own unique environment. The way colours are used in this tutorial is not only pleasing to the eye, but also brings everything together to create an effective composition.

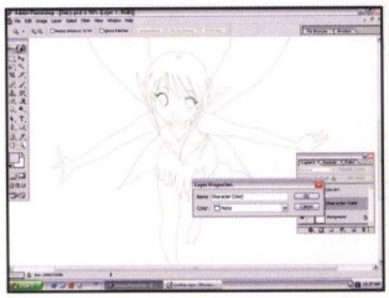
Finally, you'll learn how to add effects such as shadows and sparkles, and use blending modes to turn your work into a polished composition that's worthy of publication.

Expertise provided by Melissa Somerville. Melissa creates character designs for small projects between friends and computer-coloured anime-style artwork. You can contact her at **[e]** messachan@hotmail.com.

All the components needed to complete this tutorial can be found on the CD, in the Tutorial files\Colour your fantasy figure folder.

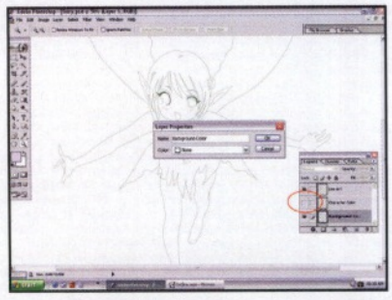
Part 1: Colour planning

Start by coming up with some colour and composition ideas...



1 In the Layers palette create a new layer and name it 'Character Colour'. This will enable you to colour under your line art later on.

2 Consider what type of skin tone and hair colours you want to give your character. Move around the picture, using a circular brush to add little blotches of colour so see how they look. Don't worry about details just yet, because you can add them later.



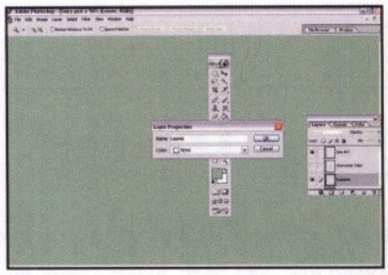
3 Now turn to the background. Hide the current layer by clicking on the eye icon. Create a new layer, name it 'Background Colour' and position it underneath the 'Character Colour' layer.

Part 2: Background basics

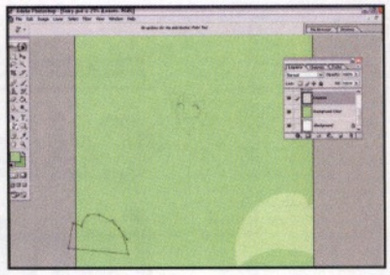
In this section, we'll begin to create an environment for our character to inhabit...

Background considerations

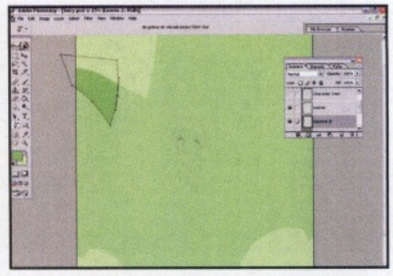
Backgrounds really help with the composition of a picture. A lot of artists just throw on colours everywhere, add brushes in random spots, and expect the image to look nice. While some people enjoy abstract art such as this, it's nice to have something a bit more considered.



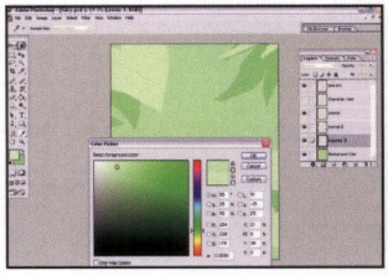
1 Go to Edit > Fill, or select the Paint Bucket Tool, and fill the Background Colour layer with a green hue. Create a new layer above this layer and name it 'Leaves'. This is where we'll be adding leaves to the background.



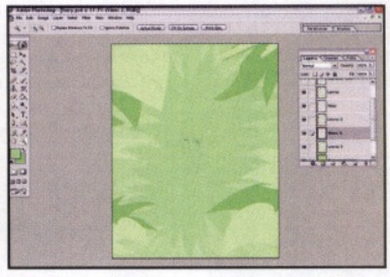
2 Begin to add some leaves, alternating between colours lighter and darker than the background to give a sense of perspective to the environment. You could use the Pen Tool to create the leaves, or use brush tips created from photos of leaves.



3 To add more leaves underneath those you've already drawn, create a new layer under the Leaves layer. Call this 'Leaves 2', and add darker coloured leaves to it.



4 Next, create a new layer with another collection of leaves. Name this 'Leaves 3'. Begin to mesh the colours into the background by choosing shades of green that are relatively close to the background colour you've used.

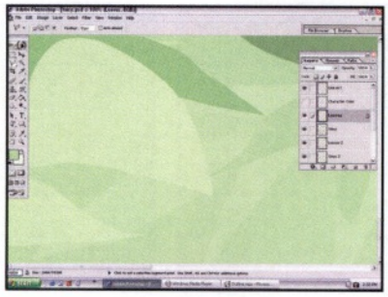


5 Now add some vines to create a forest effect. Create a new layer between the Leaves 3 and Leaves 2 layers, and another one between the Leaves 2 and Leaves layers. Name these layers 'Vines' and 'Vines 2'.

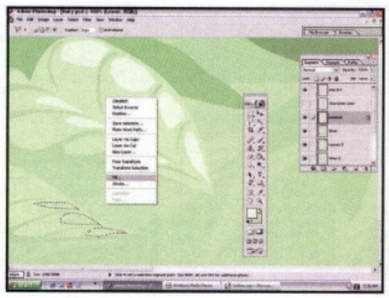
6 Begin adding your vines. Here, we're going to make them intersect on both layers. For Vines 2 we're using a colour a bit darker than the main background colour, and for Vines we're using a darker colour again.

Part 3: Detailing the background

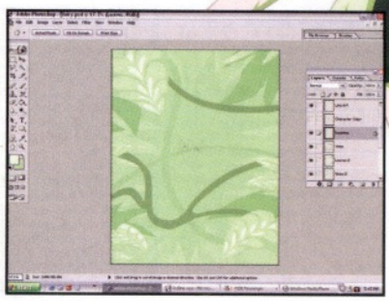
Add some details that will enhance the perspective of the scene...



1 Begin by clicking on the Leaves layer, and zooming in to around 100%. We're going to use the Polygonal Lasso Tool to add details such as shading and highlighting.

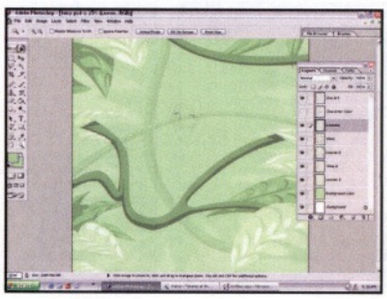


2 Create a selection to define an area you want to shade or highlight, then right-click/Ctrl-click in the selection and select Fill to fill it with your foreground colour.

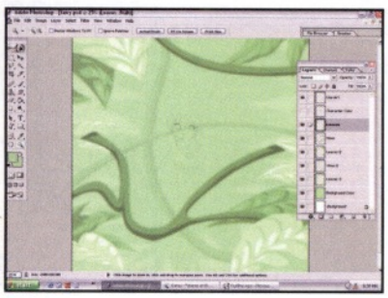


3 Repeat this process throughout the layer. It's good to have an idea of where the light source is in the image, so that you can shade or highlight areas accordingly.

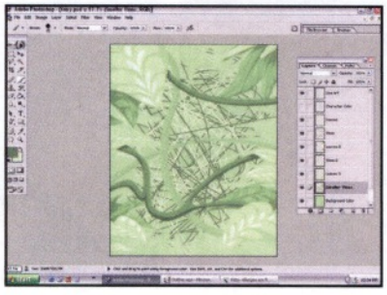
4 Do the same thing in the next layer of leaves to build up the background. It may look a bit messy at this stage, but we've a way to go yet. Finish the rest of the Leaves and Vines layers, except for the Leaves 3 layer.



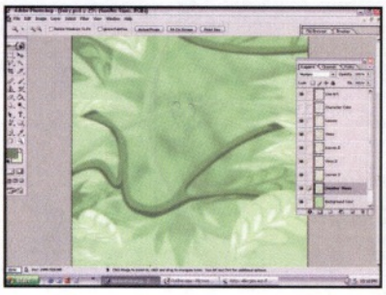
5 When you get to the Leaves 3 layer don't shade and highlight it; instead, go to Filter > Blur > Gaussian Blur and set Radius to 12 pixels.



6 Next, apply a 9-pixel Gaussian Blur to the Vines 2, Leaves 2 and Vines layers, and a 6-pixel blur to the Leaves layer. By blurring the background incrementally in this way you'll move the focus away from it, and towards the character.



7 Create a new layer above the Background Colour layer and name it 'Smaller Vines'. Next, choose two colours that contrast starkly with the background colour: one light and one dark. Set your brush to 15 pixels, and go crazy!



8 Gaussian Blur this layer as well, but this time set Radius to 50 pixels. Set the layer's blending mode to Multiply – this makes all the white in the layer disappear, and flattens the rest of the colours into the layers underneath.

9 Before you start colouring the character, group all the background files into a folder. Click the 'Create a new set' button at the foot of the Layers palette (the folder icon). Rename the folder by right-clicking/Ctrl-clicking and selecting Layer Set Properties. Name it 'Background', and make the Layer Set colour green. Drag all of your background layers underneath the Layer Set divider to add them to the folder.

Part 4: Colouring the character

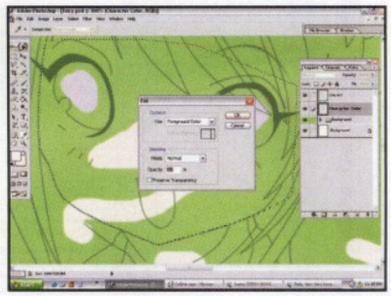
Begin to add basic colours to your character to bring her to life...

Resizing images

If you want to save computer memory, simply resize your image. Keeping your image at a large resolution (or size) gives you more detail and accuracy, especially in the early stages of inking. Resizing compresses some of the details, but gives you a better overall view of the image.

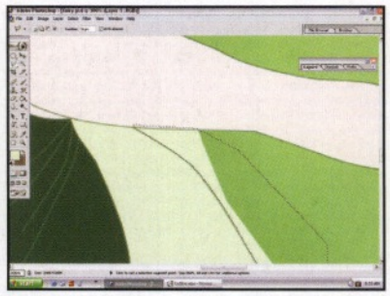
1 Let's begin with skin tones. It's a good idea to pick lighter colours for the character first, so you can then go over them with darker colours. Make sure you're viewing your image at 100% or more, and click on the Polygonal Lasso Tool.

2 Begin to select the area you want to colour – this is a bit like the tracing we did earlier. You can relax when you're doing this kind of work, because it's easy to stay on the lines.



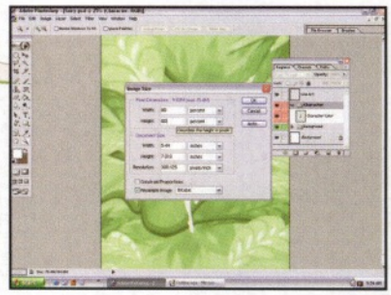
3 Right-click/Ctrl-click the selection and choose Fill. Click OK to fill the selection with the foreground colour you've chosen – this is a lot quicker than manually colouring with a brush.

4 Repeat this step with the rest of the character to fill in all the base colours. Make sure that you keep your colours subtle – you don't want to put off the viewer.

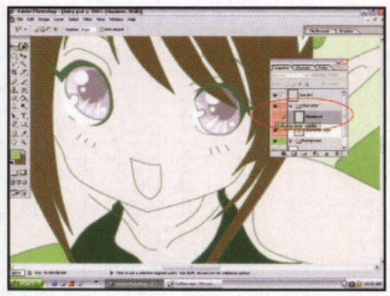


5 If you colour outside any of your lines by accident, just select the area outside the line and hit the Delete button.

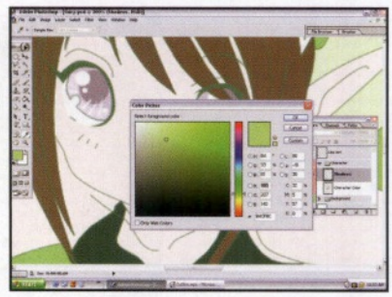
6 Create another layer set for the character, and drag all the character layers (except for the Background and the Line Art layers) into it. Name this 'Character', and give it a different colour to the Background set.



7 At this point we're going to resize the image slightly. Go to Image > Image Size, set both the Width and Height to 80% and click OK. You'll need to resize your image if it's causing *Photoshop* to run slowly.



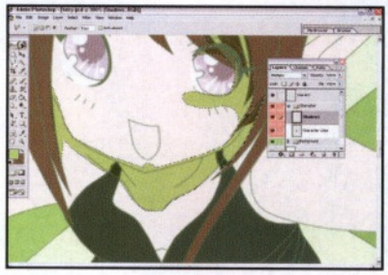
8 Open the Character layer set. Create a new layer above the Character Colour layer and name it 'Shadows' – this is the layer in which your shadows will be added. Set the layer's blending mode to Multiply.



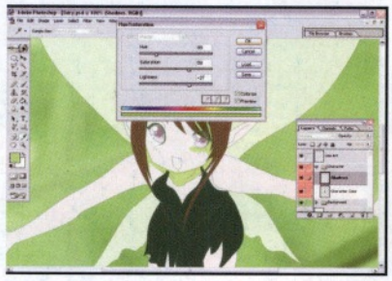
9 Zoom in to your image, and choose a green shade for the foreground colour. This colour is going to blend with the colours on other layers to make them darker, with tints of the new colour.

Part 5: Shading the character

Now we'll add shadows to the character to give her some depth...



1 Start by defining the area of the shadow with the Polygonal Lasso Tool. Remember to keep the light source constant; here, the sunlight is falling on the top of the character.



2 Shade the rest of your character in the same way. You can always change your shading colour by going to Image > Adjustments > Hue/Saturation. We're going to keep a green shade to retain the green tone of the image.

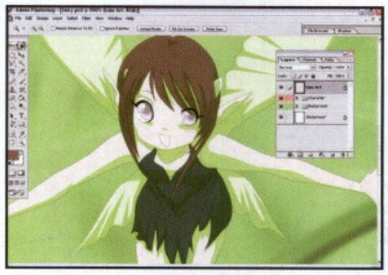
3 As the wings are drawn like frills, we're going to shade them like frills. Every time you see a bend or a curve outwards, shade a crease – it's like shading folds in clothing.

Part 6: Finishing touches

Add some final elements to complete your fairy composition...

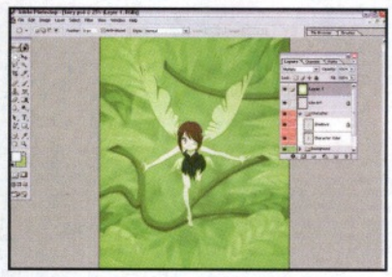
Copyright

Once you've finished your image, we suggest adding a text layer with your name and signature on it, so people know it's your work. If you want to make the image smaller, you can resize it and crop the edges a little to give your character more focus.



1 Now let's colour the line art. Select the Line Art layer, and lock the transparency by clicking the transparency box in the Layers palette. Choose a suitable brush, and begin to colour the line art to match the colours in the image.

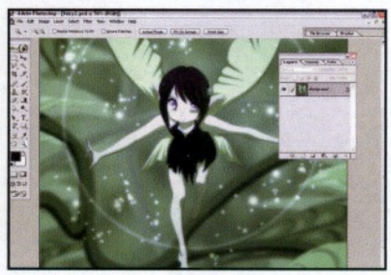
2 Click on your Shadows layer and lock the transparency. Find the colour you used for your shadows and pick a lighter shade as the background colour. Select the Gradient Tool. Select the Foreground to Background gradient, and select Radial gradient in the options bar. Click and drag to draw a gradient with the lighter shade in the centre of the image.



3 Create a new layer above your other layers and repeat the previous step, but with your lighter shade as the dark shade, and your darker shade replaced by white. Draw this gradient to that the white is in the centre of the image, and set the blending mode of this layer to Multiply.

4 Add a new layer above the last one you created and name it 'Sparkles'. Select your soft-edged brush and begin dabbing little white dots around the fairy. Create large dots first, then add smaller ones beside these. Set the layer's blending mode to Overlay.

5 Create one more new layer, and select the Elliptical Marquee Tool. Draw a circular selection around your fairy (hold down Shift to draw a perfect circle), then right-click/Ctrl-click and stroke the circle with white at 3-5 pixels. Add a 6-pixel Gaussian Blur to this layer, and set the blending mode to Overlay.



6 Flatten your layers (Layer > Flatten Image). Duplicate the flattened layer, and go to Image > Adjustments > Hue/Saturation. Click Colourize, and select a hue. Click OK, then add a 6-pixel Gaussian Blur to the layer and set its blending mode to Hard Light. Finally, flatten the image again. ■

Tutorial

[artist] Derek Lea **[w]** www.dereklea.com

Create graffiti artwork in Photoshop

By combining *Photoshop*'s tools with the right source photos and some real spray paint, you can add your original graffiti art to any wall, any time…

To create realistic graffiti art you no longer have to hit the streets with a backpack full of spray cans, looking for that secluded area where you won't get caught; you aren't at the mercy of the elements, and you don't need to break the law. All that you need these days is a handful of digital photos, a conceptual drawing of your plan, and a little *Photoshop* know-how.

In this tutorial, we'll show you how *Photoshop* provides all the tools necessary for adding some innovative digital graffiti to any photographed scene. Brushes, paths, selections, and layer blending modes are essential tools to get the job done. For that added touch of authenticity, you'll sometimes need to resort to the real deal, and in this particular case we've incorporated some basic paint drips, created with real paint, into our digital composition to give it an authentic feel. And, rather than creating a digital backdrop for our graffiti, we've decided to paint it right over top of a photo of a bare wall, using *Photoshop's* layer blending modes to make our artwork appear as if it really belongs there.

We've provided several files on the CD to help you create this stunning spray paint scene, but you've got lots of flexibility to create your own unique image. Although we've provided a sketch to use as a quick starting point, feel free to follow along using any design of your own. If you've got something else you'd rather see painted on this wall, feel free to use it. You'll notice as you follow through this tutorial that the methods will remain the same, no matter what the subject of your painting is. >

Expertise provided by Derek Lea, an award-winning illustrator based in Toronto, Canada. See more of his work at **[w]** www.dereklea.com.

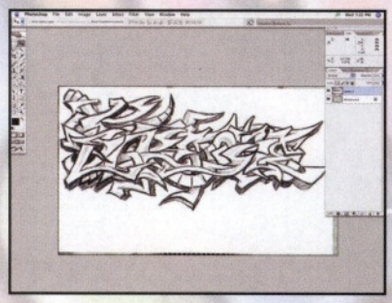
The components needed to complete this tutorial can be found on the CD, in the Tutorial Files > Create Graffiti Artwork in Photoshop folder.

Part 1: Getting started

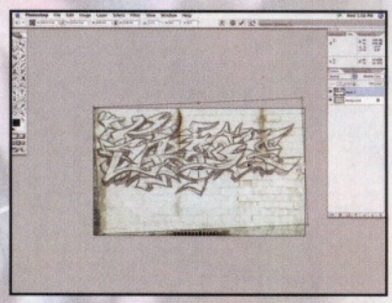
As with any proper illustration, we'll begin with a sketch

Free Transform keys

When you drag a corner of the Free Transform bounding box, you need to hold down your mouse button to preserve the horizontal and vertical aspect ratio, otherwise things will be scaled out of proportion. Holding down the Alt/Option key while dragging will scale the box from a central origin point.

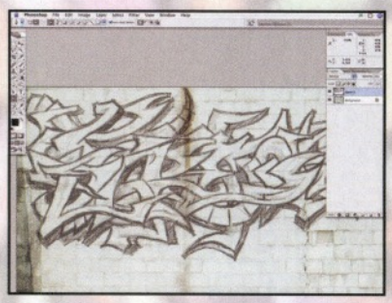


1 Open the wall.jpg and sketch.jpg files from the CD. Select the sketch.jpg file, click anywhere on the canvas area with the Move Tool and drag the sketch into the wall.jpg file to add the image as a new layer.



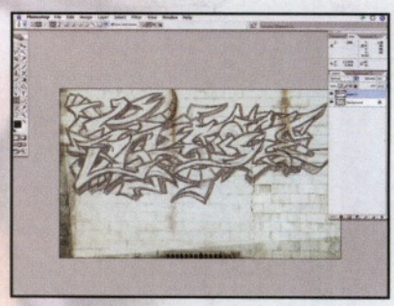
2 Reduce the opacity of the new layer so you can see the wall beneath it. With the new layer targeted go to Edit > Free Transform. Click and drag just outside the bounding box to rotate its contents, and click and drag inside the box to position it.

3 Hold down the Shift key and drag one of the box corner handles inwards to reduce the size proportionately. When you're happy with the rotation, size and positioning of the sketch press the Enter key to apply the transformation. Next, select the Pen Tool.



4 Ensure that the Paths button is activated in the tool options bar – it's the middle of the three buttons at the far-left. Also in the options bar, click the 'Add to path area' button. Draw a path that traces the edge of the artwork on the sketch layer.

5 When you've closed the path by clicking on the starting point, switch to 'Subtract from path area' in the options bar. With this option enabled, draw closed path components around the inside of each shape defined by the sketch.



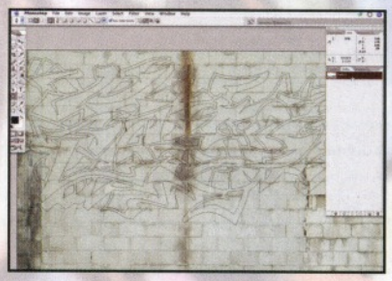
6 Carefully trace the inside of each shape area, ensuring that each path component is properly closed. When you generate a selection from this path, these components will be knocked out of the outer selection area, creating a selection that outlines your graffiti art.

Part 2: Creating an outline

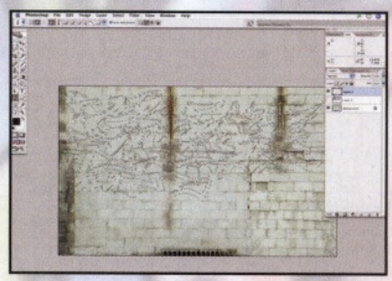
Before any colour is added, we'll need to add a realistic outline

Naming paths

When you draw a path with the Pen Tool, a temporary path called the work path is created. Work paths are overwritten each time you create a new path, so to preserve any current work path for use later on, double-click on the path name. When it becomes highlighted, type a different name in place of 'Work Path'. The next time you create a path, a new work path will appear alongside your named path.



1 Disable the visibility of the sketch layer in the Layers palette, and click the 'Create a new layer' button at the bottom of the Layers palette. Ensure that the new layer is targeted, then target your new path in the Paths palette.



2 Click the 'Load path as a selection' button at the bottom of the Paths palette to generate a selection from the path. With the new selection active, return to the Layers palette and target your new layer. Press D on the keyboard to set your foreground colour to black.

3 Press Alt/Option+Backspace to fill the active selection on the new layer with the black foreground colour. Then hit Ctrl/Command+D to deselect the selection. In the Layers palette, change the blending mode of the layer to Multiply, and reduce the layer opacity to 75%.

Part 3: Adding authenticity

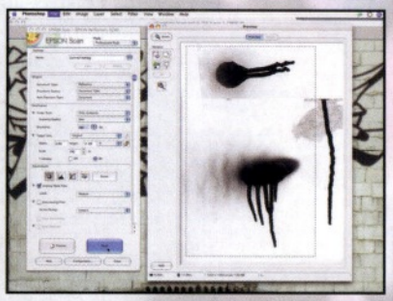
With hand-applied graffiti art, soft edges and dripping paint are inevitable

Opacity and flow

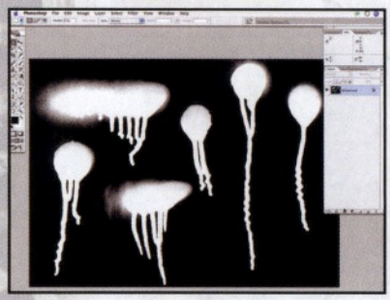
Rather than always returning to the tool options bar to set opacity and flow when using the Brush Tool, use a couple of keyboard shortcuts to improve your efficiency. Pressing a number key on the keyboard sets the opacity in increments of 10%, and while holding down Shift while pressing a number key sets the flow.

1 Go to Filter > Blur > Gaussian Blur, and enter a Radius value just large enough to soften the edges of the outlines slightly. Too high a value will result in loss of definition – although spray painting doesn't allow for perfectly sharp edges, experienced graffiti artists can make it look precise.

2 The best way to create dripping paint effects is to work with the real thing. There are a variety of digital paint packages out there, but none comes close to the look of real dripping paint. Here we've taped some paper to the wall and sprayed enough paint in certain areas to cause dripping.

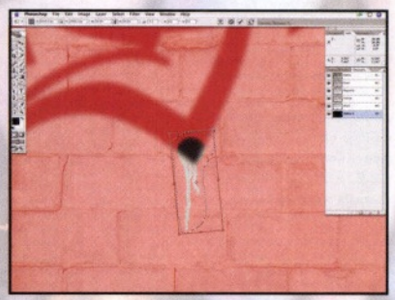


3 Once the pages are dry, we can scan the best of the drip effects and save them in one file. There's a file called drips.jpg on the CD, so just open this for the time being.



4 Because we're going to use these drips within alpha channels, we need to invert the colour of the image so that the painted areas are white against a black background, because by default white areas represent selected areas within alpha channels Choose Image > Adjustments > Invert, or press Ctrl/Command+I.

5 Use the Lasso Tool to draw a rough selection around a drip area, and copy it. Return to your working file, and click on the 'Create new channel' button at the foot of the Channels palette. Target your new channel, and enable the visibility of the composite channel.



6 Paste the copied drip into your new alpha channel. Use Free Transform to resize, rotate, and position it. Use the visible composite channel as your guide to position the drip in an appropriate area that neatly overlaps the lettering outline.

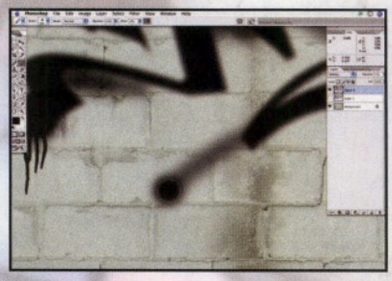
7 Use the same method to add a number of drips in appropriate places throughout the alpha channel. When you've finished, Ctrl/Command-click the alpha channel thumbnail to generate a selection from the channel's contents. With the selection active, target the composite channel, and disable the visibility of the alpha channel.

8 In the Layers palette, target the top layer and fill the active selection with the current black foreground colour, then deselect the selection. Select the Brush Tool, and in the Brushes palette choose the Soft Round 100 Pixels preset. Disable Shape Dynamics, and enable the Airbrush and Smoothing options.

9 Leave the brush opacity at 100%, but reduce the flow to 30%. Add a few brush strokes inside and outside the outlines on the black layer; the longer you keep the brush in one spot with the mouse button pressed, the more the paint will build up in that area. >

Adding authenticity, continued

10 Reducing the flow forces the brush to behave like a spray can, because paint is applied within the stroke at a slower rate. Drag quickly while holding down the mouse button to paint a light stroke, and slowly to paint a darker stroke.



11 Try creating a quick stroke, then stopping at the end of the stroke with the button still depressed: this causes the paint to build up in that spot, as it would with a spray can.

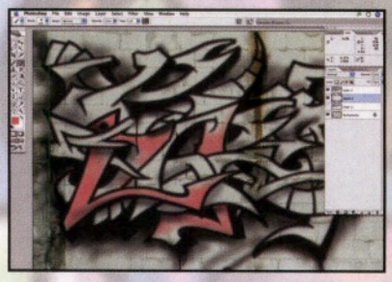
12 Use this method to add some lighter strokes around the edges of the black outlines to create an authentic look. Try increasing the brush size and reducing the flow: this creates the effect of the spray can being held further from the wall while you're painting.

Part 4: Adding colour

Now that you've finished the outline, it's time to colour it in

Paint contrast

When you're getting ready to create some drips with spray paint, try to use colours that will maximise contrast. Using black paint on a white background is ideal, as is using white paint on a black background. Using maximum contrast will save you the effort of making major tonal adjustments to create proper drip-shaped selections in your alpha channels.



1 Create a new layer, and drag it below the black outline layer in the stack. Click the foreground colour swatch in the toolbox to open the Color Picker, and choose a pink shade. Reduce your brush size slightly, and start filling in the outlines.

2 Paint as you did previously, using a low flow setting and strokes of varying speed and thickness. Then select a purple colour, and continue to paint strokes within the same regions of the artwork on the current layer.

3 Use this method to add different colours into the shape areas defined by the black outlines on the current layer. Remember to vary flow settings, brush diameter and the speed at which you paint your strokes to achieve the authentic spray-paint effect.

Part 5: Adding detail

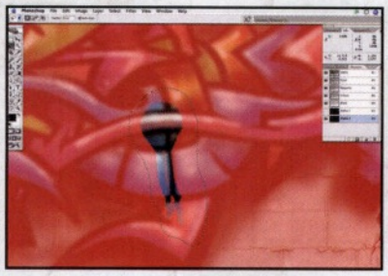
Highlight and outline effects are achieved with thinner, more pronounced strokes

1 Create a new layer, and make sure it's at the top of the stack. With this layer targeted and the Brush Tool selected, press D to reset the foreground and background colours to the default black and white.

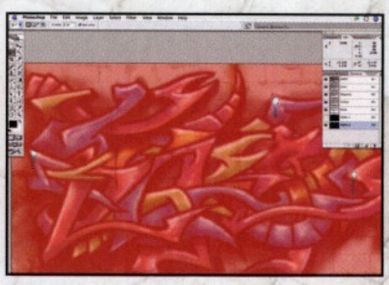
2 Reduce your brush tip diameter considerably and set flow to 30%, then paint white strokes on the new layer to create highlights.

3 Paint over some areas until you create a solid white. Then increase the brush diameter and reduce the flow, and add more strokes to create a softer, more gradual highlight effect.

Adding detail, continued



4 Return to your inverted drips.jpg file, use the Lasso Tool to draw a rough selection around a cluster of drips, and copy it. Go to the Channels palette in the working file, create another alpha channel, and target it. Enable the visibility of the composite channel again, then paste the drips selection into your new alpha channel.

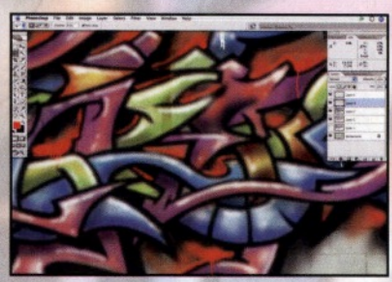


5 As before, use Free Transform to rotate and resize the drip, and position it so that it overlaps an area of opaque white. Press Enter to apply the transformation. Repeat this process to add a few drips to the alpha channel, then generate a selection from it.

6 In the Channels palette, disable the visibility of your currently targeted alpha channel. With the current selection still active, return to the Layers palette. Target the layer with the white highlights. Hit X to make white the foreground colour, and fill the active selection. Deselect the selection.

7 Create a new layer, and drag it below the white highlight layer in the Layers palette. Reduce the size of your brush until the stroke thickness is similar to that of your thin white highlight strokes. Set the flow to 35%, and begin to paint some red highlights outside the black outline on the new layer.

8 Be certain to paint over some areas enough times to establish a few solid red blobs of paint on this layer. Also, increase the brush diameter and reduce the flow setting, and paint some larger, softer strokes here and there on the current layer.



9 In what should be a familiar operation by now, return again to the drips.jpg file. Copy and paste some drips into a new alpha channel. Generate a selection from the channel, and fill the selected areas with the same red foreground colour on the current layer. Deselect the selection.

Part 6: Finishing up

Make tonal adjustments and add a little fine brushwork to complete the image

Channel options

Because *Photoshop's* alpha channel options are set by default to treat white areas as selections and black areas as masked areas, we're forced to invert the drips.jpg file for it to work properly within the channel. Alternatively, you can double-click an alpha channel's thumbnail to access that channel's options dialog, and specify that black areas are selected and white areas are masked. This will enable you to paste elements of the drips.jpg file into your channel without inverting the image first.

1 In the Layers palette, duplicate the Background layer by dragging it to the 'Create a new layer' button. Change the duplicate layer's blending mode to Linear Burn, and reduce the opacity to 67%: this will help to darken the background.

2 Click the 'Create new fill or adjustment layer' button, and choose Hue/Saturation from the menu. Reduce the saturation by 30. Then create another Hue/Saturation adjustment layer, and increase the saturation by 20. Drag this layer to the top of the stack.

3 This combination increases the saturation of the spray paint without affecting the background. Feel free to embellish the image by painting some finer strokes of vibrant colour on top of the existing layers. Do this on a new layer, using the methods employed throughout this tutorial. ■

Expertise provided by Derek Lea, an award-winning illustrator based in Toronto, Canada. See more of his work at **[w]** www.dereklea.com.

The components needed to complete this tutorial can be found on the CD, in the Tutorial Files > Create your own tag brush folder.

Tutorial

[artist] Derek Lea **[w]** www.dereklea.com

Create your own tag brush

Photoshop's custom brush tip capabilities enable you to spray your own virtual graffiti stencil tag on any photographed urban scene

Tagging in *Photoshop* is as simple as a single click of the mouse, once you've created the proper custom brush tip preset. In this tutorial we'll show you how easy it is to create your own custom graffiti brush preset.

The most important thing to remember when creating a custom brush preset is that brush tips operate using the principles of greyscale. Simply put, this means that wherever you have a solid black area, 100 per cent paint will be applied when you use this image as a brush tip preset. Conversely, areas of white will deposit no paint at all, and areas of greyscale will apply varying amounts of paint, dependent upon the amount of black in those particular areas.

When you create a brush, it's always a good idea to start with an image that's much larger than any brush you intend to use. That way, you can always reduce your preset size without affecting the sharpness of the tip. Increasing your brush size beyond its original dimensions, on the other hand, can result in deterioration of quality and pixelation.

1 Open the sketch.tif file from the CD. Select the Pen Tool, and begin to draw a path that traces the outline of the main black areas of the sketch. Make sure that the Paths and 'Add to path area' option are enabled in the tool options bar.

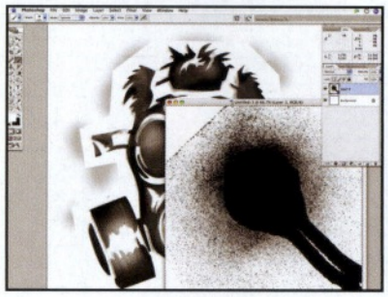
Brush features

Once you've saved your brush as a preset, the possibilities for brush variation are considerable. Try experimenting with the various settings in the Brushes palette; if you're using a tablet and stylus many of these can be set to Pen Pressure under the Control menu.

2 Carefully follow the outline all the way around, and click on your starting point to close the path. Draw additional closed paths around other black areas that aren't connected to each other. Control/Command-click on your path thumbnail in the Paths palette to generate a selection from it.

3 With the selection active, create a new layer. Hit D to set the foreground colour to black, then press Alt/Option+Backspace to fill the active selection on the new layer with black. Reduce the layer opacity to 58%. Keep the selection active, and create another new layer. Select the Brush Tool.

4 Choose a soft round brush tip from the Brush Preset picker or Brushes palette. Apply strokes here and there to darken areas within the selection on the new layer. Type X to switch the foreground colour to white, then paint over other areas at a lower opacity setting.



5 Select the Polygonal Lasso Tool, and draw a rough selection in the outer area surrounding the mask. Hit Control/Command+Shift+I to invert the selection. Type X to restore the foreground colour to black, then paint some light strokes on the inside edge of the selection on the new layer. With the selection active, open the spray.tif file.

6 In the spray.tif file, hit Control/Command+A to Select All. Return to your working file, and choose Edit > Paste Into to paste the spray as a new layer, masked by the current selection. Now target the layer mask, and use a black brush to mask unwanted areas from the layer.

7 Open the scratches.tif file. Select all and copy. Return to your working file and paste the selection into the file as a new layer. Change the layer blending mode to Lighten. Duplicate the scratches layer by dragging it to the 'Create a new layer' button in the Layers palette. Use the Move Tool to offset this layer slightly.

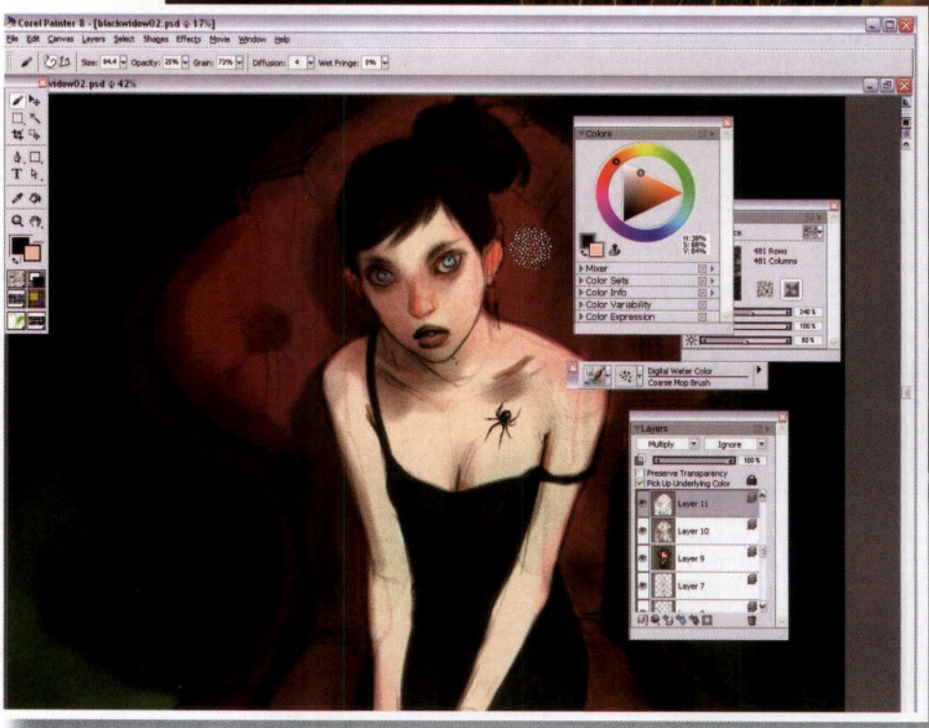
Layer stacking

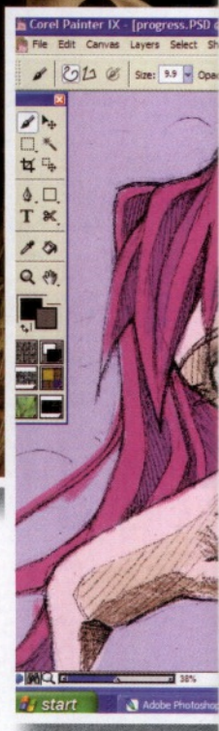
Try altering the blending mode of the layer on which you've used your brush. Then duplicate the layer and try another different blending mode. You can achieve interesting effects by duplicating layers and having a variety of blending modes working together.

8 Open the negative.tif file, and use the Move Tool to drag it into the working file as a new layer. Change the blending mode to Lighten, and position it with the Move Tool. Duplicate this layer and offset it slightly, just as you did with the scratches duplicate layer. Target the Background layer in the Layers palette.

9 Set your current foreground colour to white and fill the entire Background layer. Choose Layer > Flatten Image to flatten the file. Choose Edit > Define Brush Preset. A dialog box will appear, prompting you to name your brush. Name it, and click OK to add this new brush to your list of presets.

10 Now that you've saved your image as a brush preset, you can access it via the Brush Preset picker or the Brushes palette. Simply select the preset, reduce the size as required, then click once on your image using any colour you like to add your tag to the scene. ■


Corel Painter 8 - [blackwidow02.psd @ 17%]
File Edit Canvas Layers Select Shapes Effects Movie Window Help
widow02.psd @ 42%
Colors
Mixer
Color Sets
Color Info
Color Variability
Color Expression
Digital Water Color
Coarse Mop Brush
Layers
Multiply
Ignore
Preserve Transparency
Pick Up Underlying Color
Layer 11
Layer 10
Layer 9
Layer 7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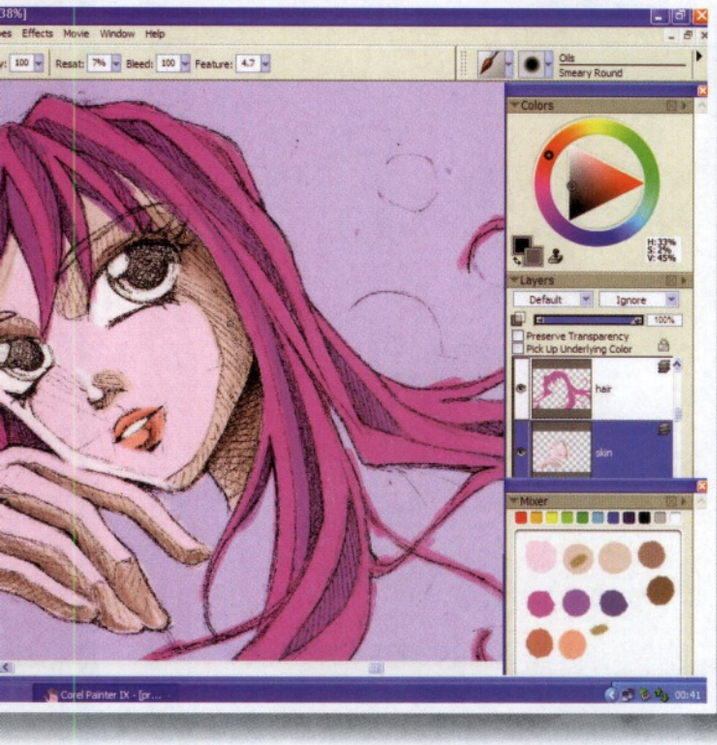

3

Painter and Poser

We kick off this chapter with a real treat for aspiring comic illustrators as acclaimed artist Steve Miller shows you how to create fantasy characters. There's a fascinating feature on concept art for movies, and you'll find out how to create a concept art fantasy world step by step. We've got a whole host of great *Painter*-based tutorials (although you can just as easily follow them in *Photoshop*), ranging from gothic-style art to Manga, and we'll also show you how to create a 3D fantasy figure using *Poser* and *Z-Brush*, and add it to a backdrop produced in *Photoshop*.

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122	20 character design tips
127	Digital fantasy painting
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136	Create fantasy figures in Poser
142	Painting an eerie goblin world
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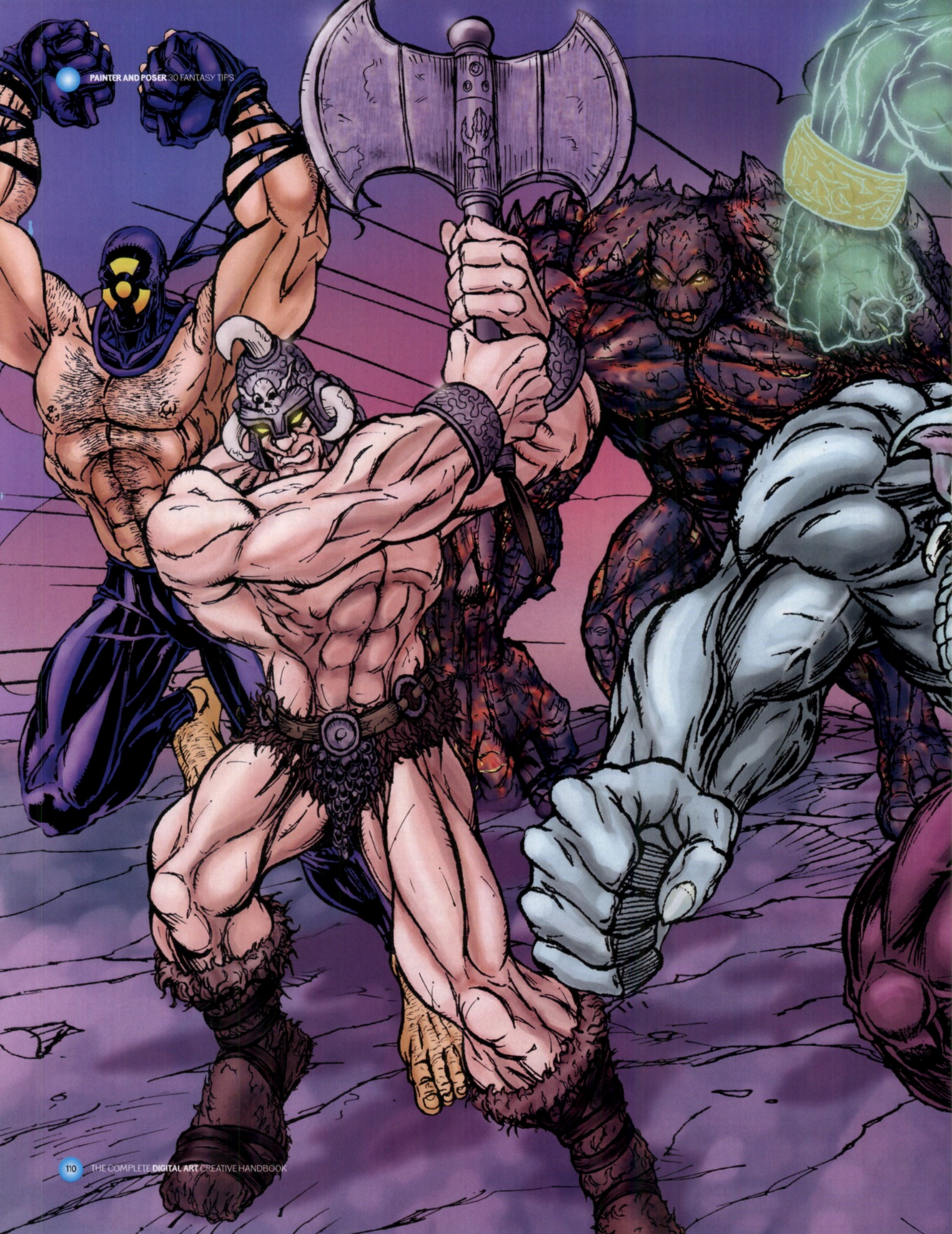
152	How to draw Manga
154	Dramatic Manga painting
156	Painting satin gowns



Feature

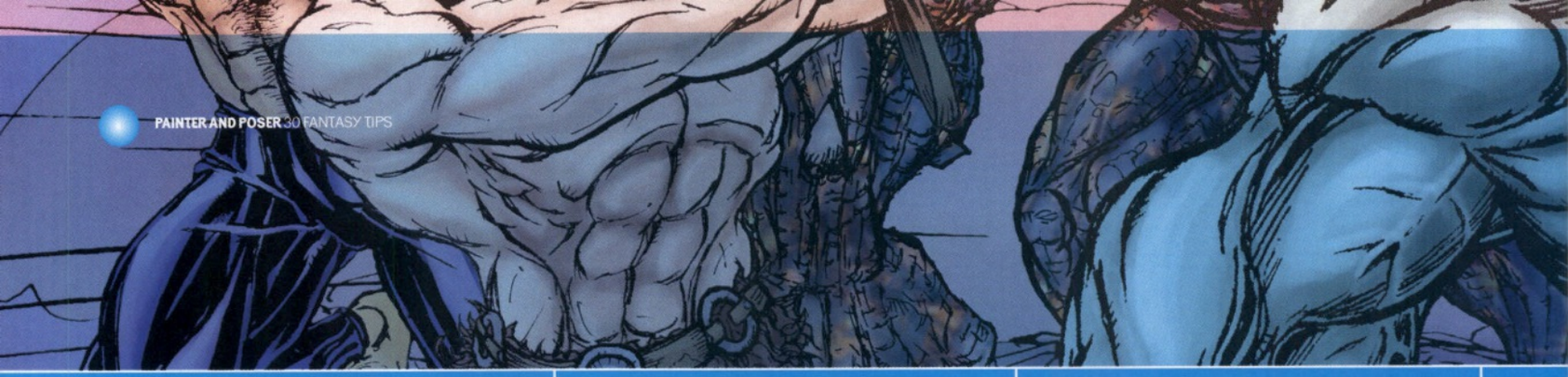
[illustration] Steve Miller [w] www.illustratorx.com

30 fantasy tips

We follow acclaimed character artist Steve Miller as he creates a stunning comic illustration...

Being able to knock out fantastic fantasy characters comes with experience, and who better to share that experience than self-proclaimed "merry mad monster maker" Steve Miller. Steve has written a number of *How to Draw Books*, including *Freaks!: How to Draw Fantastic Fantasy Characters* (animal people), *Scared!: How to Draw Fantastic Horror Comic Characters* (monsters), *Thunder Lizards!: How to Draw Fantastic Dinosaurs*, and *Gung Ho!: How to Draw Fantastic Military Characters and Vehicles*, all available from Watson-Guptill publications.

On the following pages, Steve shares some of his best fantasy art tips learned from years of drawing characters for animation, games, action figures and comics. He'll talk you through how he has designed, sketched, scanned and coloured a few of the wild denizens from his imagination. These tips will help spark the fire of your imagination, and enable you to unleash some fantastic fantasy freaks of your own. >



1 Fantasy kit

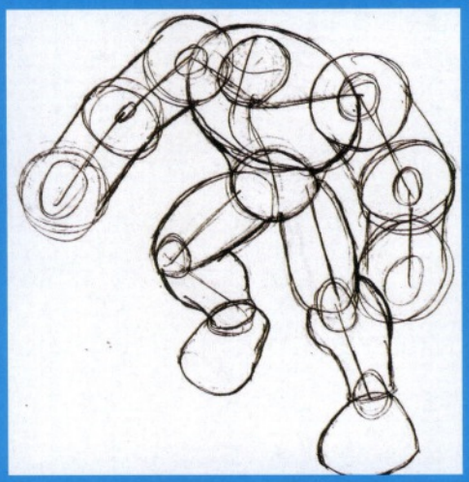
For colouring and image manipulation I use mainly *Photoshop CS* and *Painter IX* running on a PC powered by an Athlon Thunderbird 1.23GHz processor with 1GB of RAM. My computer has a S3 Trio 3D/2X 8MB AGP Video chipset to help push all those pixels around almost as fast as I can paint them. For brush input, I mainly use a 4x5 Wacom PenPartner graphics tablet. I have a couple of larger tablets, but I keep coming back to this compact stand-by. My initial drawings are done by hand on a drawing table purchased when I was 12. Over the years, this coupling of traditional and digital mediums has evolved into a workflow which provides me with maximum flexibility in my art, while greatly reducing my man hours.

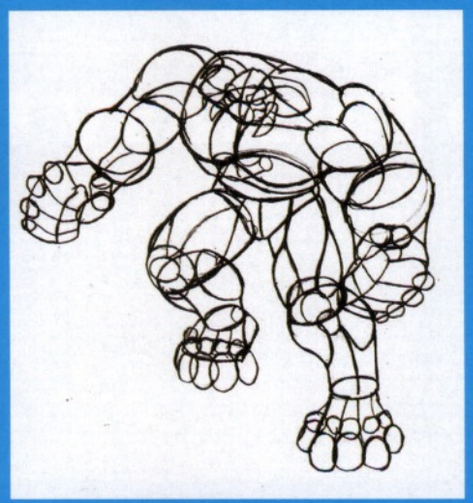
2 Coming up with concepts

I start a project by roughing out a few thumbnails and initial concepts for character designs. For this illustration, I knew I wanted several different mega-muscled fantasy characters coming right at the viewer. Group shots like this can become cluttered if they aren't designed with a central anchor point to capture the viewer's eye, so early on I decided I wanted a hulking Elephantman character to be the main focal point.

3 Basic body work

The early stages are the most crucial of any drawing, because it's here you'll establish a pose that will either appear fluid and life-like, or create a clunker which, no matter how expertly you render and colour, will still appear stiff. Once I'm happy with the pose, I draw a figure using basic building blocks such as modified cubes and cylinders, then I rough in anatomical features using bodybuilder magazines or anatomy books as reference. I usually do the initial pose lightly with a non-photo blue pencil so I can draw the more constructive step directly over it with a darker HB lead. I've reproduced both steps separately here, and digitally darkened the line work to make it clearer.





4 Working in groups

Once I've finished the central character, I can go ahead and repeat the construction process for the other five characters. For a group shot of this size, I create a separate document for each character, which gives me several manageable small files instead of one mammothly huge one. This also provides maximum flexibility when I compose the final piece, because each figure can be moved freely about the drawing and moved either in front of or behind other characters to best serve the composition. I try to keep each element at the same level of completeness as I work, so I'll draw all the figures first, then colour them at the same time, and finally assemble the illustration.

5 Scan your drawing

The basic individual construction drawings are scanned into *Photoshop* using an oversized Epson Expression 836XL scanner. The Epson is perfect for illustrators because it enables you to scan illustrations up to 800x1,600dpi, with a tabloid-sized area of 12.2x17.2 inches. At this stage in the drawing I don't need it at high resolution, so I set the scanner to colour scan at 150dpi.

6 Resize your sketch

In *Photoshop* I do a quick colour selection (Select > Color Range) to select and delete the non-transfer blue pencil marks, and then adjust the levels (Image > Adjustments > Levels) to darken the remaining pencil marks. Next, I resize the sketch to the size of the final drawing (Edit > Free Transform). For most projects, I prefer to work as large as possible, so that the drawing appears crisper when shrunk down and the details are tightened.

7 Choose a duotone

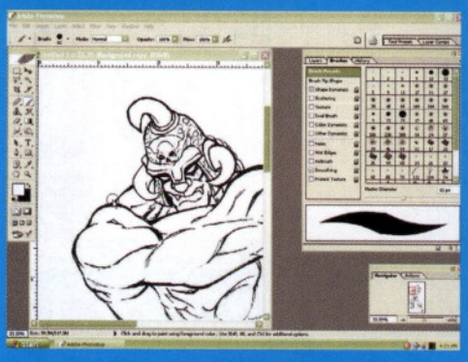
Once I've the drawing at the correct size, I change the mode to greyscale (Image > Mode > Grayscale). From here I change the mode one more time to Duotone (Image > Mode > Duotone.) The colour chosen for the duotone step should be extremely light. I usually use either a pastel green or lavender shade; it doesn't really matter what you choose because this colour won't appear in the final drawing. Fluctuating between purple and green will give your printer cartridges an even workout, and won't drain one ink reservoir quicker than the others.

8 Printing and digital inking

I then print the drawing on to a sheet of 11x17-inch paper using my Epson Stylus Photo1200 printer. Depending on what the client wants, I'll use either cheap printer tabloid paper if the drawing is to be scanned then coloured, or sturdy Bristol board if the final pencil step is needed for a presentation. Regardless of the paper it's printed on, I do the final, tightly rendered pencil drawing right over the pastel printout. This is the most time-consuming step, since my pencil lines will be cleaned and darkened for the final illustration in a process nicknamed 'dinking', an abbreviation for digital inking.

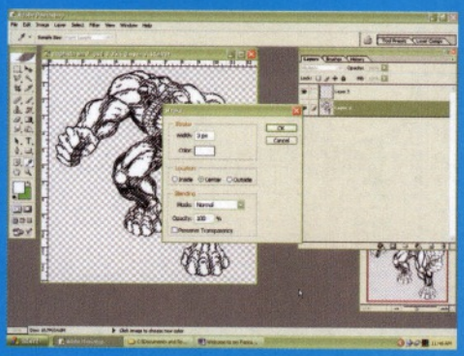
9 Convert to greyscale

When I have the final pencil drawing finished, I scan it back into *Photoshop*, set for colour at 600dpi. Then I use Color Range to select the pastel under-drawing and hit Delete to remove it, leaving only my final pencil marks. It's now safe to convert the drawing to greyscale mode. Again, the Levels are adjusted to darken my pencil marks so they appear black, and the background is made a bright white. Once I have the artwork levels adjusted, I decrease my file size to 300dpi, the standard for print work.



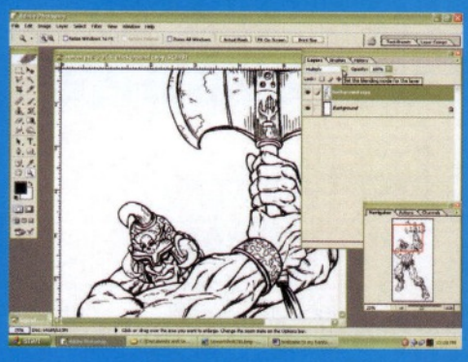
10 Specialised 'dinking'

This next tip is the most important step of my 'dinking' process, and one not too many others use. I select the white areas of the drawing, and on a new layer I add a 3- or 4-pixel centre stroke with white (Edit > Stroke). I set the layer to Normal blending mode and 100% opacity. This process removes any dust or stray pixels, and also softens the sometimes rough appearance of pencil marks while giving the lines a crisp inked looked. This can be repeated a few times, increasing the Stroke by 1 or 2 pixels until the line work appears suitably crisp. When I'm happy with the line work, I merge the Stroke layer down into the drawing. Now the drawing is ready to be coloured.



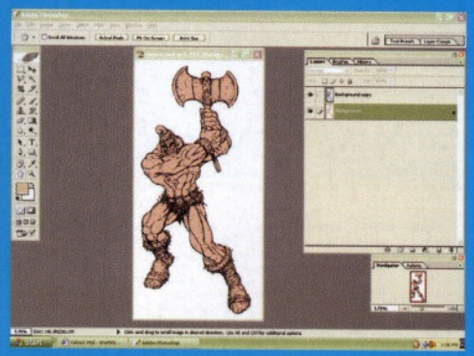
11 Prepare for colour

The blending mode of the line work layer is changed to Multiply, and the drawing is placed over a plain white background that will become the layer on which we do the actual colouring. The easiest way to select the figure completely is by using the Magic Wand Tool to select all of the blank white background around the character and then inverting the selection (Select > Inverse).



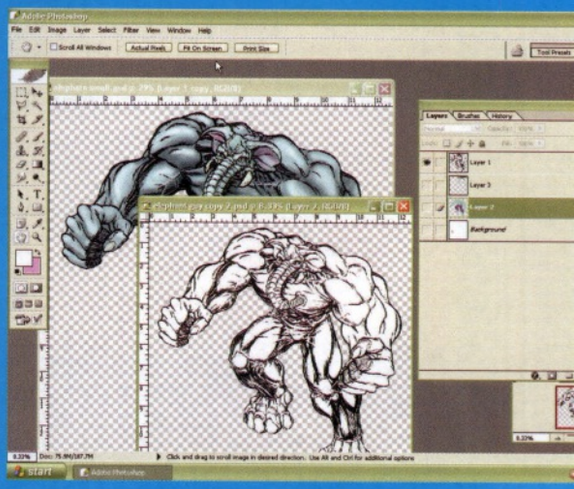
12 Lay flats

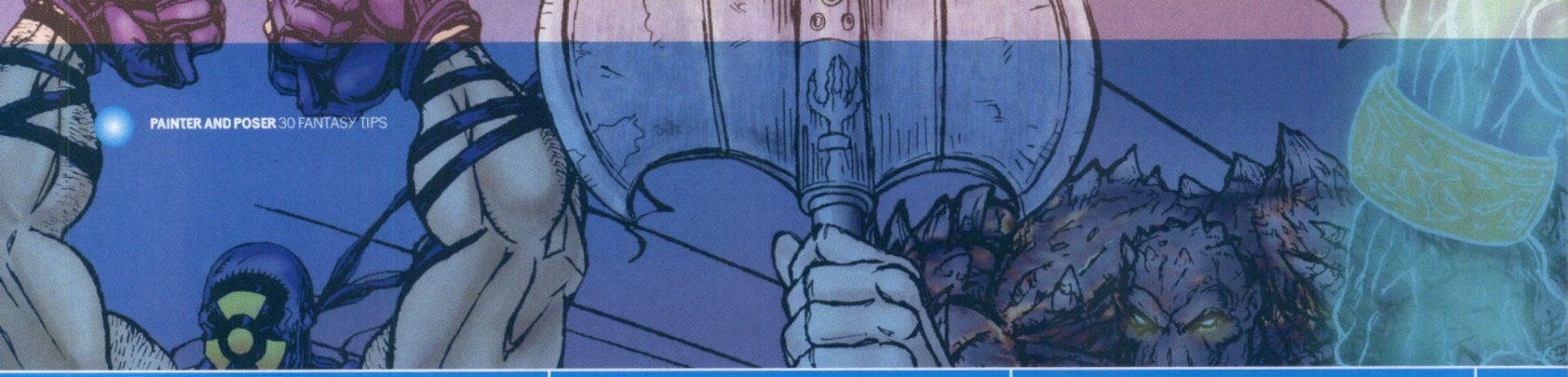
On the background layer, fill the selection with a medium tone that will be the central colour for the character. This process is known as 'laying flats'. Since this Axe-Wielding Barbarian is wearing minimal clothing, I've chosen a flesh tone for his flat colour.



13 Speed things up

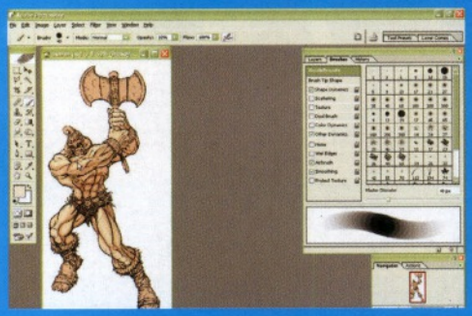
If you have a slow computer or a large file, you don't need to colour your work at the same high resolution you'll want for your final illustration. To speed up the colouring process, I create a duplicate file of the line work at a dpi of only 150. When I've finished the colouring process, I'll discard the line work layer and convert the remaining colour layer to 300dpi. You can then transfer the colour layer back to your original high-resolution line work file, and the colours should line up perfectly.





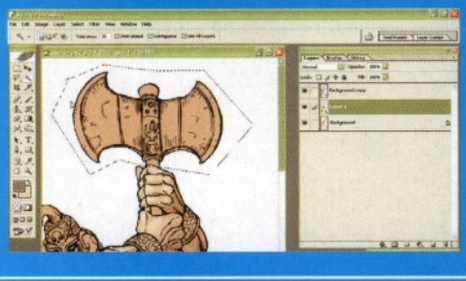
14 Highlights and shadows

Once I have a medium flat colour for the figure established, I begin to render the different anatomical features by adding highlights and shadows. I use a two-on-two tonal scheme. This means that over my medium flat tone I will make four total passes over the character. On the first pass, I'll add medium highlights using a colour slightly lighter than my flat colour. On the next pass, I'll use a much lighter shade of my flat colour. Using this method enables me to build a believable three-dimensional form. Once I've completed my two passes at adding highlights, I go back over the figure twice more, each time adding a darker layer of shadow.



15 Add colour to accessories

With the basic figure finished, I colour his accessories. Create a new layer for the accessory colours, and follow the same steps you used for the main figure, first laying a flat tone for the whole object and then going back and rendering it. For objects like his axe, which is surrounded by large areas of white, the fastest way to select it is to use the Polygonal Lasso to draw around the object and surrounding background, and then use the Magic Wand to select the unwanted white areas while holding down the Alt/Option key.

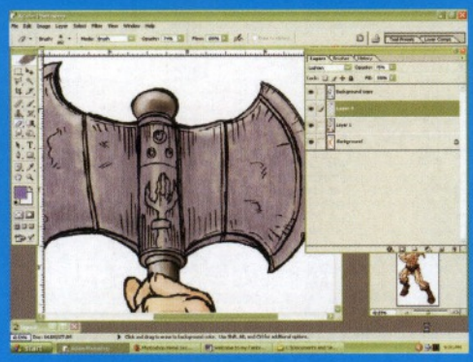


16 Damage effects

To quickly create a weathered or battle-damaged look, create alternating large patterns with one of the default Spatter brushes. I added a couple of quick strokes of white and black with a spatter brush set at 30% opacity to give this axe the look of being well used.

17 Metallic finishes

The axe is looking pretty good now, and you can make it even better by giving it a slightly more metallic look. On a new layer, reselect the axe head, fill it with a grey background and then add some noise (Filter > Noise > Add Noise). In the dialog box set Amount to 25 and Distribution to Gaussian, and make sure that the Monochromatic box is checked. Next run the motion blur filter (Filter > Blur > Motion Blur), setting the Distance value to 75 pixels and keeping the angle value at 0. This creates a grey square that looks like a square of aluminium. Change the layer's blending mode to lighten, and decrease the opacity to 75%. Now that's a battle axe any Barbarian would be proud to cleave an innocent with!

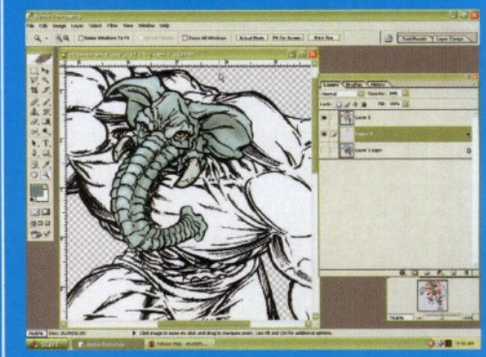


18 Overlapping figures

I've already decided that the Axe-Wielding Barbarian character will be in the foreground of the illustration, in front of the Leaping Masked Wrestler character. When you have characters with similar overall colour palettes (in this case, flesh colour) overlapping, you run into the problem of the characters blending into each other. To help differentiate the figures, and also to give them a greater sense of depth, I like to create a cool tone variation of the background figure. So using the Variations command (Image > Adjustments > Variations), I choose a variation of the Wrestler with more blue and cyan.

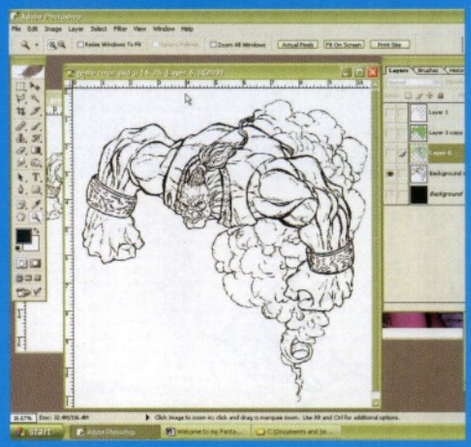
19 Variations options

You can also use the Variations command on parts of a character to make them stand out from the rest of the figure. For the Elephantman, I ran into the problem of his head not being as easily distinguished from the rest of his body as I would have liked. So by selecting just his head and using the Variations options, I was able to create a head just slightly more chromatic than the rest of the figure.



20 Glow-in-the-dark effects

For the Genie character, I knew I wanted to give him a slightly ghostly, glow-in-the-dark look. I drew and scanned him just like the other characters. For the colouring process, I didn't decrease the resolution of the line work, but coloured him full-size because I knew I would be using some filters on the layer that are resolution-specific.

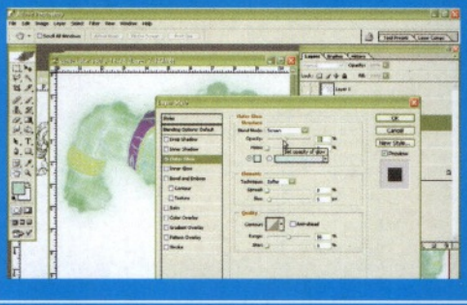


21 Fill selections

To get the light-green outline for the figure I first used the Color Range command to select the line work for the Genie, and then, on a new layer, I filled the selection with a light-green colour.

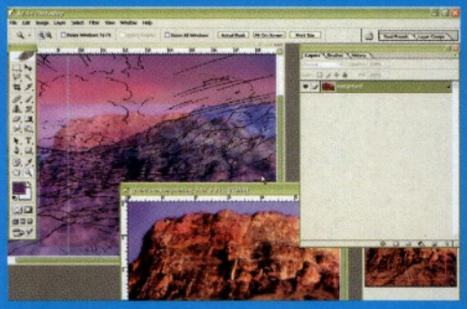
22 Perfect the glow

To make the Genie's eyes blue I repeat the previous steps, but only select the lines surrounding his eyes, and fill them with a light-blue colour. Then I used an airbrush set to 30% opacity to colour the Genie in light shades of green, and filled his clothes with flat colours at 60% opacity. I then applied an Outer Glow layer effect (Layer > Layer Style > Outer Glow) to give the character a luminescent look. I further tweaked the effect by adjusting the glow's variables after I had transferred the Genie to the final illustration with the other characters.



23 Background source files

I drew, scanned and coloured the background just like I would a character. To give the background a realistic rocky texture I created a new layer using a copy of a photograph of the Grand Canyon. I set this layer's blending mode to Soft Light, and erased whatever parts of the photograph did not line up with rocks in the illustration.



24 Minimum contrast

I merged the photo with the background's colour layer, and decreased the contrast slightly for the overall background (Image > Adjustments > Brightness/Contrast). It's important to remember that you want to keep the contrast of colours on the background at a minimum, especially for a drawing like this where you already have many colours in the characters competing for dominance. Finally, I ran the Paint Daubs filter (Filter > Artistic > Paint Daubs) to give the background a paint effect.

25 Position your characters

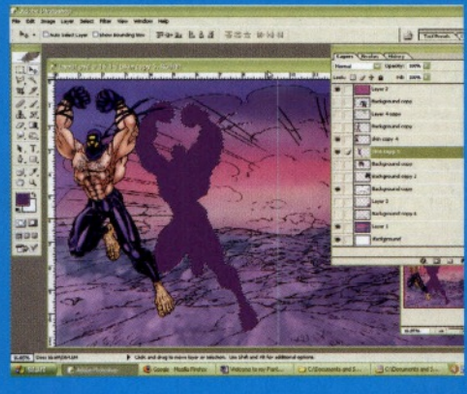
One by one I placed the characters over the background, moving them until I was happy with their positioning. To get the characters on to the background I merged the line work to the colour layer for each character, and then dragged and dropped the combined layers on to the background file.

26 Colour adjustment

As the characters were added, I again made use of the Variations command to slightly adjust the overall colouring of the characters. In this instance, the background has a blueish-purple overall tone, so by adjusting the character's palettes to include a greater percentage of cyan and magenta they appear to fit better with their background.

27 Add shadows

Adding shadows is a great way to really make your figures look like they belong in their environment. I created each shadow separately for the characters by first duplicating the character layer, and then filling the character's form in this duplicate layer with a dark purple colour. Never use black or grey for your shadows: always choose a cool hue such as purple or blue.



28 Gaussian Blur

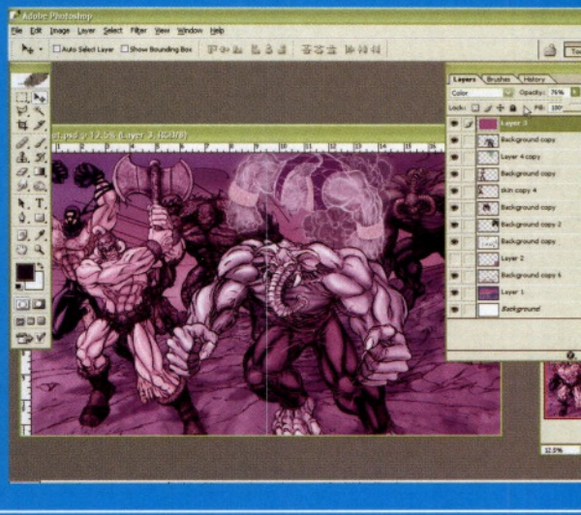
I placed this layer directly under the character layer, and used the Distort command (Edit > Transform > Distort), to reshape the mass into a convincing shadow shape on the ground. Finally, I ran the Gaussian Blur filter set to a Radius of 12 pixels to soften the shadow's edges.

29 Adjust the composition

Because there are so many figures and variables to be mindful of in an illustration of this size, there's sure to be a lot of adjusting and moving before you get all the elements lined up correctly. You should always try to line up figures so that they appear to be moving in a unified direction. And you don't want to have figures cut out of the frame right along a joint, such as at the ankle or elbow, because it will look like the character is missing a limb.

30 Introduce local colour

Local colour is a lighting phenomenon whereby objects reflect and absorb the colours of the objects around them – a good example is that if you wear a white shirt in a room with red walls, your shirt will appear pink. Local colour can be added to a scene like this one quickly by adding a new layer above all the others and setting its blending mode to Color. You'll want to fill this layer with a central colour that you feel ties all of the characters and the background together: for this piece, I chose a lavender colour. If you have the layer set at 100% opacity, you should see a monotone rendition of your illustration. For a pleasing local colour effect, you'll want to drop down the opacity to somewhere between 7% and 12%. The final step in creating this illustration is to use an airbrush set to 15% opacity to add glows to the characters' eyes and make the axe shine. ■



Feature

[image] *The Hitchhiker's Guide to the Galaxy* © Disney Enterprises, Inc. & Spyglass Entertainment, LLC. All rights reserved.

Concept art for movies

Ever considered a career producing the designs that shape the look of cool science fiction and fantasy movies? We take a closer look at this exciting but highly demanding digital illustration niche...

Without proper planning and refinement, the results of most creative endeavours will rarely be of much use. It's why painters through the ages have sketched out their ideas first. And it's why so many visually driven industries – from video game development to car and furniture design – rely on concept artwork to outline the basic form, feel, dimensions, colour schemes and textures that will drive and inspire the remainder of the design process.

Perhaps the most exciting application for concept art is in the film industry, where these designs can prove just as influential as the movie script for establishing the look and mood of each and every filmed sequence. The greater the emphasis on outlandish visual elements, the more exciting and vital the work of the concept artist. Not surprisingly, it's science fiction and fantasy movies that provide the most (and most interesting) opportunities for the concept artist.

The biggest differences between producing concept art for film and working as a professional artist in any other area inevitably arise from the scale of movie projects. Few other entertainment fields bring together so many creatives, and none are so expensive to produce, or are micromanaged so keenly for profit. This impacts on the role of the concept artist in two significant ways.

One is the loss of creative control. Certainly concept artists are employed for their wild imaginations, but it's important to remember that they ultimately serve a higher purpose, and so must exercise their creativity within parameters that are defined by other people. Even the likes of H R Giger have seen their designs diluted or discarded in the past.

Imaginative ideas

"The final result of our work is not the drawing, but the idea," stresses Feng Zhu ([w] www.artbyfeng.com), a highly regarded designer who recently worked on *Star Wars Episode III: Revenge Of The Sith*. "The audience is not paying to see our sketches, but rather the finished film. Our artwork is useless once the design has been taken to the finished level. We are always designers first, artists second."

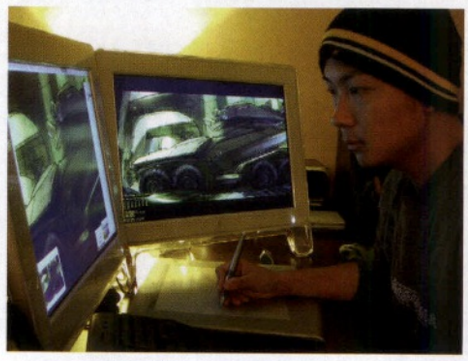
Then there's the need to focus. Some concept designers are required to depict scenes and themes in broad strokes, but often there's intensive work to be done on very specific props, costumes or visual effects sequences. Additionally, the scale and collaborative nature of film work means there's a tendency to work in teams: this isn't an environment for diva designers.

How teams work

"An art department for a movie has anywhere from three to ten concept artists," says Christian Lorenz Scheurer ([w] www.christianlorenzscheurer.com, [w] www.thegnomonworkshop.com/dvds/csc01.html), a celebrated concept artist who has worked on such prestigious film projects as *The Fifth Element, The Matrix, Dark City* and *The Day After Tomorrow*. He explains that this team contributes to the film's pre-visualisation stage. "Once it's greenlit, the post-production houses get involved, and often a new set of concept artists is hired to design specific environments and effects. Recently, however, studios such as the big animation houses and special effects companies like ILM have been consolidating all the production stages."

Feng Zhu explains that design teams are generally divided up according to each artist's own particular strengths: "Some will design man-made, 'hard surface' designs, such as environments, props and vehicles. Others will concentrate on organic, soft surface things, such as creatures and characters. But, of course, there is always some crossover, so we ultimately tend to work in both areas."

Over at animation studio Blue Sky Studios ([w] www.blueskystudios.com), illustrator Daisuke 'Dice' Tsutsumi ([w] www.simplestroke.com) was responsible for concept design work on the animated fantasy comedy *Robots*. His involvement on the movie highlights how other kinds of crossover can also be expected. "I was a colour key artist for both *Ice Age* and *Robots*, defining scene lighting with my colour sketches," says Daisuke. "I was also one of the main visual development artists on *Robots* right at the start. That basically involved providing your ideas of how to tell the story through illustrations. It's very similar to producing children's book illustrations, really."



Above: A digital concept design created by Feng Zhu (pictured right). "Working digitally gives you a lot more freedom, with the main aid being the undo key," he says. "We can experiment with our designs without worrying about messing anything up, and we can also apply textures or photo-scrap into our paintings."

While computer graphics have been a staple of movie post-production for two decades now, their widespread use during the pre-production phase has been a much more recent development. Part of the reason for the slow uptake has been inertia, but it's also taken some time for technology to advance to a point where artists are able to produce concept designs with the same degree of freedom as they could with traditional media.

Digital pre-production

"Digital painting media has changed the world of illustration completely in the past five to ten years," says Daisuke. "Traditionally trained artists can now achieve the same look in packages like *Photoshop* and *Painter*, using natural, intuitive strokes, but working with tremendous speed and greater flexibility."

While some concept art is first sketched by hand and then scanned into the computer, there's no doubt that the rest of the creative process is faster when done digitally. "We don't have to wash brushes, mix our paints, or wait for canvases to dry," says Feng Zhu. "All we need now is a fast computer, good graphics software, and a

The art of the Animatrix

Originally conceived as part of the *Matrix Revolutions* script, *The Animatrix: Final Flight of the Osiris* was created by a small faction of the Square USA team following its work on the movie *Final Fantasy: The Spirits Within*.

"Working within a reduced staff of about 40, I was in charge of designing the 'Real World'," says Christian Scheurer. "In the first *Matrix* it consisted of only a couple of tunnels. The task was to create an enormous destroyed city featuring a large ominous crater, where drillers start their journey to Zion. In addition, I was assigned to pre-visualise the massive sentinel armies which would snake like silver eels through the crater."

Christian says he was given full creative freedom when producing the concept designs, taking inspiration from a description from one of the Wachowski brothers of "a city looking like tombstones of an old graveyard, marked by heavy machinegun fire."

"I started by creating nine conceptual paintings based on very simple 3D block models," says Christian. "What started as concept art actually got used as final matte paintings, and I ended up as a lead matte painter working alongside Richard Mahon (who worked on the *Matrix* sequels) and Kazunori Nakazawa, a fantastic mechanical designer from Japan."

Below: Digital concept art created by Christian Scheurer for *Final Flight of the Osiris*. Scheurer embraced digital techniques while working on previous project *Final Fantasy IX*. "I personally now like to paint in the computer, but I still return to the drawing board every so often," he says.

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Wacom tablet. We can basically go on to any project and immediately start working without a ton of art supplies."

Improvements in CG for post-production widen the possibilities for concept artists, too. As Feng Zhu points out, a movie such as *Episode III: Revenge Of The Sith* simply wouldn't have been viable a decade ago: "The scope George Lucas wanted wasn't achievable with the technology at the time. These days, we have no limits to what we can design. It is now up to our imagination, not technology, to govern our ideas."

"Software is just another tool, though," he cautions. "Going digital doesn't make you 'better'. A lot of students or impatient designers want to go digital right away, and get frustrated as a result. They forget that most of the artists today, who work digitally, come from a traditional background. It is experience that makes these artists professional, not the software or the process."

3D technologies

One interesting repercussion of the switch to digital is that concept designers are now also able to embrace 3D technologies. At the most basic level, applications such as *Maya, 3ds max, Cinema 4D* and *XSI* can be used as perspective aids, but many designers now integrate 3D renders and *Photoshop/Painter* freeform elements far more thoroughly.

"There's still a place for concept work created purely in *Photoshop*, but I think 3D is now one of the more exciting ways to communicate ideas and at the same time save money on productions," suggests Joel Collins, Art Director on *Hitchhiker's Guide* and co-founder of the Painting Practice studios ([w] www.paintingpractice.com).

"A lot of 2D concept artists work from a graphical point of view, rather than a filmmaker's," adds studio co-founder Dan May. "They really need to be in tune with the designs that will be drawn from their work."

The aim of Painting Practice is to combine concept work and pre-viz, making the studio a 'one-stop-shop for pre-production'. "We're also able to build up a good 3D arsenal," says May. "We've been working with 3D for a long time now, so have a strong collection of models that give us a sort of virtual studio to work with."

The benefits of working in such a creatively led field as concept design are easy to fathom. It's a career that can also be surprisingly lucrative for those in greatest demand. "Top film designers receive anything from $2,500 to $5,000 per week, usually working 11 hours a day," reveals Christian Scheurer.

Getting into the industry

For illustrators looking for a career in concept design, but unsure how to get a foot in the door, Scheurer's own story is heartening. Inspired to leave his native Brussels for Los Angeles after a near fatal lightning strike, he quickly found employment at Digital Domain. "It was probably my naivety combined with a kind of unbound enthusiasm which got me my first job there," he recalls. "It also helped to physically show up at the studio doors instead of just sending a resumé to human resources. I'd advise trying to arrange meetings with art directors and producers even if they aren't hiring at that moment in time. And you should always ask for advice and feedback."

A little self-promotion can also go a long way, and it's easier than ever to advertise your talents without any real outlay. The

Right: Digital illustrations by Daisuke Tsutsumi (pictured below), a concept designer who worked on the animated fantasy movie *Robots*. "Most of us at Blue Sky Studios' concept department came in with no digital painting experience," he reveals. "It doesn't really matter, there will always be a place for good illustrators in this industry."

internet effectively provides an international gallery for a portfolio. Anybody can quickly create a professional-looking website, while posting on public forums such as those at CG Talk ([w] www.cgtalk.com) and ConceptArt ([w] www.Conceptart.org) offer great opportunities for advertising and useful networking.

Competing for work

Ultimately, however, it's those artistic skills that matter the most. Feng Zhu points out that concept design for film is a very competitive area, with only a limited number of films in production at any one time (and those produced in Hollywood only employ unionised designers). Only the best and most determined artists and designers are ultimately destined to carve out a career for themselves in this exciting, inspiring and fast-moving field.

"Studios like to work with the same group of people, so it's difficult to penetrate this circle if your portfolio is weak," explains Feng. It should be equal or even better than the pros out there. In the end, there are no shortcuts. The more you draw, the better you'll become." ■

The Hitchhiker's Guide to the Galaxy

Painting Practice founders Joel Collins and Dan May champion a more 3D-reliant kind of concept design, one where a greater degree of accuracy greatly aids with pre-visualisation and post-production. Most recently they worked on art direction for *The Hitchhiker's Guide to the Galaxy*.

"The director, Garth Jennings, created lovely little pencil roughs as a starting point, but we would then create the designs using *Cinema 4D*," explains Joel. "He'd then base his storyboards on what we'd built, and those boards would then feed back to us, helping us refine designs and remove every bit of fluff that was unnecessary or too expensive."

As well as providing data for pre-viz, this spatially accurate design work was also taken into *Photoshop*. "There we'd add the hand-drawn element, giving it a sense of 'life'," says Joel. "In the end, about 80 per cent of the Photoshopped images were created by painting over the 3D."

The data also proved valuable further down the line. "We exported all the planet factory elements like a Meccano kit, handing about two gigabytes of models to the post production team," says Dan. "I think they were surprised that an art department could hand them 3D files that could be used as more than a mere guide."

Above and below: Art Director Joel Collins suggests that blending traditional concept art with accurate 3D modelling makes for a more practical kind of pre-production design: "It's a different approach to just handing out a brief to a concept artist and letting them go crazy, producing something that often isn't practical within a film's budget."

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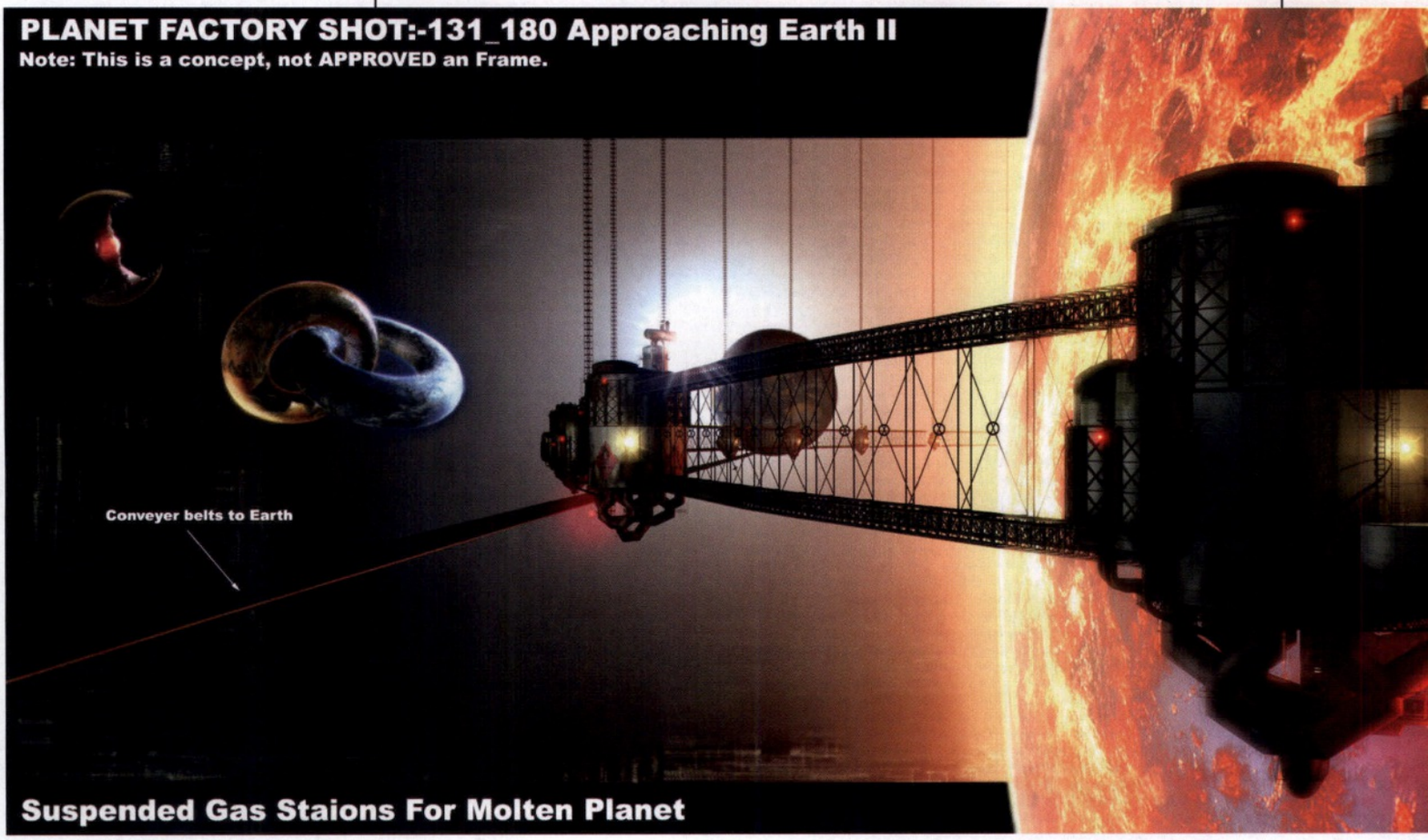
PLANET FACTORY SHOT:-131_180 Approaching Earth II
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Conveyer belts to Earth
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Feature

20 CHARACTER DESIGN TIPS

20 tips for creating fantastic characters, and the best ways to bring them to life

Character design can be a tricky beast to tackle, because although many of the classic characters familiar to us all through cartoons, entertainment and advertising look simple, that simplicity usually belies the many hours of work that have gone into their development.

From Mickey Mouse's famous three-fingered hands – drawn to save production time when the character was first developed for animations in the 1920s – to the elegant simplicity of Homer Simpson, character design has always been about keeping it simple. But aside from clean lines and easily readable features, what else are you going to need to know? There's knowing what to exaggerate and what to play down, what to add to give a hint of background and depth, and what to do to develop personality. Getting started can be the trickiest part in any character development project, but once you've got some ideas these tips will help you breath life into your creations...

Far left: Nathan Jurevicius creates beautiful immersive worlds, rich in character and harmonious in their colours and hues. This image depicts his Scary Girl character taking a boat ride with her cohorts through seemingly treacherous waters.

Contributors:
www.helloduudle.com
www.scarygirl.com (Nathan Jurevicius)
www.duudle.dk (Sune Ehlers)
www.parishair.com (Neil McFarland)
www.schizoid-brain.com (Yuck)
www.illikedrawing.co.uk (Ian)

Expertise provided by Jon Burgerman. See more of his work at [w] www.jonburgerman.com.

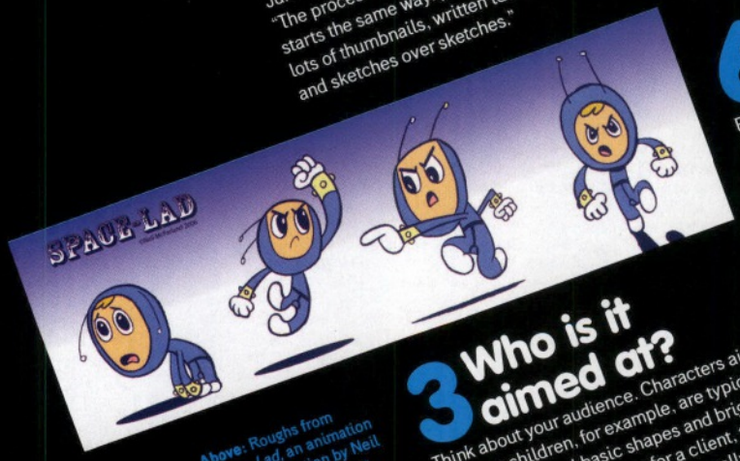
20

1 Research and evaluate

It can be helpful to try and deconstruct why certain characters and their characteristics work, and why some don't. There's no shortage of research material to be found with illustrated characters appearing everywhere: on TV commercials, cereal boxes, shop signs, stickers on fruit, animations on mobile phones, and more. Study these characters, and think about what makes some successful, and what in particular you like about them.

2 Design and plan

Where will the character be seen, and in what medium? This will have a direct bearing on how you go about your design. For example, if the character is for a mobile-phone screen, there's no point designing it to have a lot of intricate details and features. Nathan Jurevicius says, regardless of the format, "The process of thinking up concepts always starts the same way: paper, pencil, green tea, lots of thumbnails, written ideas, scratches and sketches over sketches."



Above: Roughs from Space-Lad, an animation in pre-production by Neil McFarland. The inkings show some of the range of emotions and body shapes performed by the lead character.

3 Who is it aimed at?

Think about your audience. Characters aimed at young children, for example, are typically designed around basic shapes and bright colours. If you're working for a client, the character's target audience is usually predetermined, as Nathan Jurevicius explains: "Commissioned characters are usually more restrictive, but no less creative. Clients have specific needs, but also want me to do my 'thing'. Usually, I'll break down the core features and personality. For example, if the eyes are important then I'll focus the whole design around the face, making this the key feature that stands out."

4 Visual impact

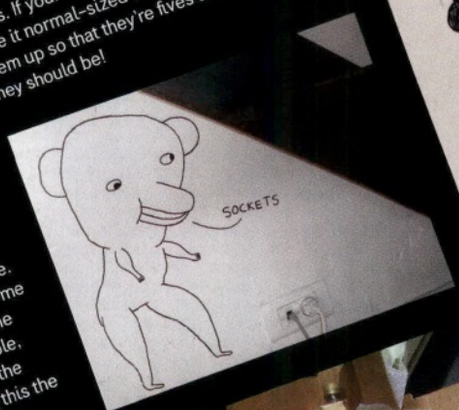
Whether you're creating a monkey, robot or monster, you can guarantee there are going to be a hundred other similar creations out there. Your character needs to be strong and interesting in a visual sense to get people's attention. When devising *The Simpsons*, Matt Groening knew he had to offer the viewers something different. He reckoned that when viewers were flicking through TV channels and came across the show, the characters' unusually bright yellow skin colour would grab their attention.

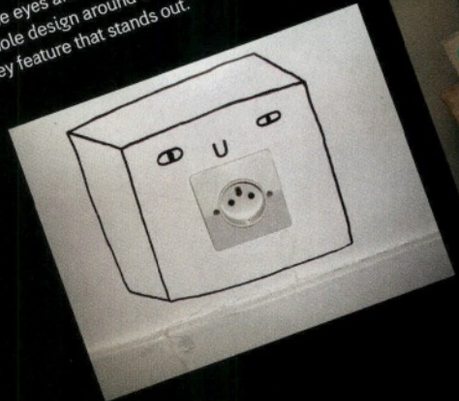
5 Line qualities and styles

The drawn lines of which your character is composed can go some way to describing it. Thick, even, soft and round lines may suggest an approachable, cute character, whereas sharp, scratchy and uneven lines might point to an uneasy and erratic character. Sune Ehlers' characters are bold and seem to dance on the page, which echoes his approach to drawing them. He explains: "Drawing a doodle is about decisive pen-manoeuvring. A strong line for me comes from strength and rhythm."

6 Exaggerated characteristics

Exaggerating the defining features of your character will help it appear larger than life. Exaggerated features will also help viewers to identify the character's key qualities. Exaggeration is key in cartoon caricatures, and helps to emphasise certain personality traits. If your character is strong, don't just give it normal-sized bulging arms, soup them up so that they're fives times as big as they should be!





Left and above left: Ian, of I Like Drawing, uses his native environment for inspiration and as a platform to create and exhibit his characters.

Left: These sketches by Yuck (top half), Nathan Jurevicius (bottom left) and Jon Burgerman (bottom right) give a fascinating insight into the character creation process.

9 The third dimension

Depending on what you have planned for your character, you might need to work out what it will look like from all angles. A seemingly flat character can take on a whole new persona when seen from the side if, for example, it has a massive beer belly. If your character is going to exist within a 3D world, as an animation or even as a toy, working out its height, weight and physical shape is all important.

10 Conveying personality

Interesting looks alone do not necessarily make for a good character; personality is key as well. A character's personality can be revealed through comic strips and animations, where we see how it reacts to certain situations. The personality of your character doesn't have to be particularly agreeable, but it does need to be interesting (unless your character is purposely dull). Personality can also be expressed simply in how the character has been drawn.

11 Express yourself

Expressions showing a character's range of emotions and depicting its ups and downs will further flesh-out your character. Depending on its personality, a figure's emotions might be muted and wry, or explosive and wildly exaggerated. Classic examples of this can be found in the work of the legendary Tex Avery: the eyes of his wild Wolf character often pop out of its head when it's excited. Another example of how expressions communicate emotions is dead-pan Droopy, who barely registers any sort of emotion at all.

12 Goals and dreams

The driving force behind a character's personality is what it wants to achieve. This missing 'something' — be it riches, a girlfriend or solving a mystery — can help to create the dramatic thrust behind the stories and adventures your character gets up to. Often the incompleteness or flaws in a character are what make it interesting.

13 Building back stories

If you're planning for your character to exist within comics and animations then developing its back story is important. Where it comes from, how it came to exist and any life-changing events it has experienced are going to help back up the solidity of, and subsequent belief in, your character. Sometimes the telling of a character's back story can be more interesting than the character's present adventures... or not, in the case of the Star Wars prequels.

Above: Yuck maintains the charm of his original pen sketches by retaining the irregular line thicknesses and feel of the drawings. The earthy colours and scraggy shading give his popular puppy character a slightly worn and dishevelled appearance.

Right: Sometimes using different inks and pens can produce appealing outcomes, as Jon Burgerman explains: "With Pinky-Lee from *Hello Duudle – The Duudleville Tales*, I wanted something of a contradiction in the way she looked to complement her personality and back story. The soft pink felt pen for her lower half plays against the black fine liner for the top half. Hopefully these two qualities cancel each other out."

7 Say it with colour

Colours can help communicate a character's personality. Typically, dark colours such as black, purples and greys depict baddies with malevolent intentions. Light colours such as white, blues, pinks and yellows express innocence, good and purity. Comic-book reds, yellows and blues might go some way to giving hero qualities to a character.

8 Adding accessories

Props and clothing can help to emphasise character traits and their background. For example, scruffy clothes can be used for poor characters, and lots of diamonds and bling for tasteless rich ones. Accessories can also be more literal extensions of your character's personality, such as a parrot on a pirate's shoulder or a maggot in a ghoul's skull.

14 Quick on the draw

Don't be afraid to experiment, and ignore all the rules and tips about planning and crafting the look of your character. Going against what is supposed to be the right way of doing something could create unexpected and exciting results. When artist Yuck creates his characters he doesn't really know what he'll draw. "I just listen to music and draw the result dependent on my mood: freaky or cute. I always want to have a drawing that I find interesting. I then work more on the character after it's okay with me and my brain," he says.

15 Hone, plan and polish

Instead of just drawing or doodling without too much pre-planning, Nathan Jurevicius prefers to take a different approach. "I take a long time creating finished-looking roughs and also thinking about how the character could be expanded beyond a 2D artwork, what the character will do in a specific world, and how it speaks and acts," he says.

16 Drawn in mud

Having decent materials to work with is useful, but not essential, for the early planning of your character. A lot of amazing characters were successfully designed years ago when no one had personal computers, and *Photoshop* was just a dream. The drawings of your character should still work when rendered on paper with a simple pen or, as Sune Ehlers puts it: "The character should still be able to work with a stick dipped in mud and drawn on asphalt."

17 Real-world drawing

Ian, of I Like Drawing, generates some of his characters away from both the computer and the sketchbook, allowing outside elements to influence his work. "I really like characters that interact with their surroundings," he says. "The environment normally suggests an idea and then I let my strange mind do the rest. I prefer drawing in the real world with a pen instead of on the computer, because it feels good and odd things happen."

18 Release the beast

Show people your creations and ask them what they think. Don't just ask whether they like them or not. Instead, see if they can pick up the personalities and traits of your characters. Find who you think is the suitable or ideal audience for your work, and get feedback from them.

19 Beyond the character

In the same way that you create a history for your character, you need to create an environment for it to help further cement believability in your creation. The world in which the character lives and interacts should in some way relate to who the character is and what it gets up to.

20 Fine-tuning a figure

Question each element of your creation, especially things such as its facial features. The slightest alteration can have a great effect on how your character is perceived. Illustrator Neil McFarland advises: "Think about the meaning of the word 'character'. You're supposed to breath life into these things, make them appealing and give them the magic that will allow people to imagine what they're like to meet and how they might move. I think it's strange how creating characters for the sake of it has become a distinct branch of graphic design." ■

Below: It's interesting to compare these Nathan Jurevicius toys to the preliminary sketches of the characters (see previous page). In the original, Dr Maybe (left) looks a bit docile, but in the final toy the sculpting around the eyes gives him a slight air of menace.

Top: Sune Ehlers leaves his characters in a rough and quickly sketched state. Here you can still see the lined paper on which he has drawn the doodle. The energy with which he draws his characters is directly reflected in their appearance on the page.

Illustration by Robert Chang [w] www.ethereality.com

Digital fantasy painting

Expertise provided by Robert Chan. You can see more of his work at [w] www.ethereality.com.

You'll find the completed image on the CD, in the Tutorial Files > Digital Fantasy Painting folder.

This tutorial guides you through each step of painting a fantasy digital painting using *Photoshop* and *Painter*. By **Robert Chang**

This tutorial is for my newest painting, *Till Death Do Us Part*, and it depicts a family of three (mum, dad and baby) being hunted by demon stalkers. The parents protect the baby with their lives, while the demon stalkers conjure dark magic using the skull of a fallen comrade as their source of power. The father counters the assault with his own magic, channelled through his sword.

This tutorial will take you from the sketch all the way to the finished painting. You should be fairly familiar with *Photoshop* and *Painter* for this tutorial, as some of the tips are exclusive to those applications. However, the best way to learn from a painting tutorial is to not get hung up on the software details, but to understand the mentality and the approach of the artist.

Today's painting software is highly competitive and often features similar tools – that's why understanding how and why an artist uses a specific tool is more important than duplicating the tutorial step-by-step.

Ideally, you should have some basic art foundation to attempt this tutorial – whether this is from formal training or just time spent as a hobbyist.

You should also have a tablet suitable for digital painting, such as a Wacom Intuos or Graphire product, or their equivalent. Digital painting with a mouse is like cooking with a hammer – a special kind of punishment to test your tolerance for lack of efficiency and ergonomics. My motto is: gimme a tablet or nothing at all. >

Shortcut

Cursor toggle: F2/F3 (PC)
A custom-made action in *Photoshop* that enables you to toggle between the tool icon or the crosshairs – switch to the crosshairs for precision work.

1 The first sketch

I always start with a very rough sketch at desktop resolution (either 1,600x1,200 or 1,280x1,024). I have this habit of filling the blank canvas with light grey, because a glowing white monitor is too harsh to stare at. I never draw on the background layer, because having a separate layer for the drawing is easier to deal with when you start making corrections and edits later. I always do the early stages in *Photoshop* because it's so much better at editing than *Painter*, and there's always a lot of editing in the early stages.

The first sketch is normally so rough that the only person who could understand it is myself. Once I'm happy with the composition, I'll fade that sketch layer to about 20% opacity, open up another layer and then do a clean drawing using the faded sketch as a guide.

In case you don't know, flipping the image horizontally (or looking in the mirror) is an old illustrator's trick. I have never seen a scientific explanation for this reasoning, but my guess that it's because we all have a bias, depending on whether we're left or right-handed. Favouring one would mean that your brain is wired to naturally lean in one direction, so when you look at your drawing in the mirror, you'll notice what appeared to be proportionally fine has obvious mistakes such as crooked eyes or slanted vertical lines. I flip my image horizontally as soon as my brain gets used to seeing the shapes, so that means I'll flip the image between five and 10 times over a couple of hours when I'm painting.

I wanted a dynamic feel when depicting this scene, so I used a tilted horizon and a slight 'worm's eye' angle. Usually, when I'm happy with the drawing, I'll go ahead and delete any sketch layers I don't need any more, and I'll also turn the background back to white, and save a JPEG version for the sake of documenting the steps.

2 The colour rough

This stage is what I call the colour rough stage, where colours are blocked in quickly to be tested out. I usually put the colours on another layer, and either have the drawing layer on top set to Multiply blending mode, or vice-versa – as long as the drawing can be seen clearly, along with the colours.

When blocking in colours, I'm basically testing the colour scheme to see if it works. I'll also do some fast shading as well, to get a feel for the lighting I want. If everything looks fine, I'll move to the next stage.

3 Colour evaluation

In this case, I didn't like the original colours that I'd used, so I went ahead and tweaked the colour rough into something closer to what I had in mind. I knew I wanted autumn colours, and I decided that either an overcast or partly cloudy sky would be best to convey the feeling I was after.

4 On with the painting

Now the painting phase officially happens. It's actually not a good idea to separate drawing and painting, because you never really stop drawing while you're painting, but for the sake of clarity I make a clear distinction between the two. This helps to organise the process.

When I start this stage, I always fade the drawing enough so that it doesn't make the values/colours hard to read. I sometimes go ahead and erase parts of the drawing that I don't need any more, because the colour rough has already defined them. Usually though, I just fade the lines so that I can still see them, but they don't overpower the image.

Next, I throw caution to the wind and flatten all layers. Yep, this is when serious business begins. I would then most likely start the official painting on a separate

Short cut

Flip Horizontal: F11 (PC)
This custom-made action in *Photoshop* mapped to F11 will flip the canvas horizontally. This is a valuable shortcut when you're flipping often.

layer, so the colour rough is undisturbed. There's a good reason for this, which I'll get into later.

As you can see, I decided that I wanted to have some blue in the sky, instead of a completely overcast sky. This part was done in *Painter* because I wanted the wet-on-wet aspect of *Painter's* brushes for the clouds; *Photoshop* cannot simulate wet-on-wet painting.

I also made sure that the characters' skin tones reflected the blue of the sky. I started painting dad's face with broad brush strokes. I pretty much nailed the look I wanted right off the bat, something which rarely happens!

In the early stages, I tend to be bolder with my brushwork, then as the painting progresses, I become more cautious, which is a bad thing because all the spontaneity goes out the window and things start to stiff up. Ideally, I should be bold throughout the entire painting process, not just early on.

5 Work on the sky

I decided that I wanted the overcast sky back; however, this time I wanted an over-exposed look, much like in photography where the sky appears overblown. I then gave the background a hazy look, a bit like fog or atmospheric haze. I also made lots of changes to the dad's face.

6 Stop and review

I decided I liked the old version better, so I cut and pasted it back. Notice that I also wanted the blue sky back again (this time it stayed). This is why I said to save steps, so that you can compare to the older versions to see if you're going in the right direction or not. Also, when I said it's good to keep the colour rough on its own layer, it's so that you can toggle its visibility to see if you're doing all right compared to the feel you created originally.

A lot of changes happened here. The mum's face and body proportions became totally different, but I hated them after comparing the new version to the older one. I can't stress enough how important it is to keep comparing to the old versions, because you could veer off the right track and not know it. I tried a different design for the demon stalkers, but it didn't seem to work. I also designed the skull scythe weapon, but it didn't feel right.

I added the mountains in the back using one of the Wet Acrylic brushes in *Painter*, as this gave me the squiggly bristle lines that I wanted. I also changed the dimensions of the image at this stage to be standard desktop proportions.

7 Make your changes

I changed the mother back, but altered her pose a little. Dad's legs were moved to a different angle. You can see that the leaves have gone from the top-right corner; I wasn't sure if I wanted them any more, so I got rid of them for the moment, and liked how the sky opened up for a different feel. I also decided that the mega shoulder pad armour cloak design for the demon stalkers looked silly, so I changed it back to a plain hood and cloak. I also thought it might look better to have double-bladed scythes, as they look a bit like a cross, and I can't recall the last time I saw anyone design a double-

Back track

I always compare my current progress with earlier versions. The reason is because frequently, while painting, I'll refine/change/add/erase in such a way as to actually have negative effects on the painting. Sometimes I would spend a long time refining a face and then, when comparing it to an earlier version, realise that the earlier version looked better. When that happens, I'll cut and paste the old version over the new one (just the area that looked better in the older version).

bladed scythe. The mountain got tightened up a bit, and I painted the autumn-coloured trees on the left. I used a palette knife brush with the Random jitter on for that impressionistic leafy look.

Here's an important point: if you're about to make some big changes, always do it on a separate layer, because it's extra security in case you don't like your changes. Working that way in *Painter* is a problem, however, because some of *Painter's* brushes will leave artifacts (dark, random marks) on the spot where you paint on a blank layer that has no background.

8 Character assessment

The demon stalkers got redesigned. I wanted them to be more like puppets, with empty ivory shells filled with black smoke (demonic creatures with no set shape), and I wanted the smoke to drift out of the cracks and each orifice of the puppet shell. I also thought the brown of their cloaks made brown too much of a dominant colour, so I changed this.

9 Lighting

I felt that the sky was too dark at this point, and I remembered an earlier step where the sky looked like it was overblown and overcast. I tweaked the sky to look similar to that older version, using *Painter's* Histogram tool. I noticed that the lighting on the family and the background were inconsistent, so I changed the values on the background to match the values on the family. I gave the demon stalker in the middle a demon skull, so he could use it to channel the power of a fallen comrade (the green ghost fire).

Remember I said to keep things on separate layers if you can? Here, I changed the position of mum's leg and, because the family is on a separate layer, it was easy to make changes. You can see that the old colour rough is still underneath where the leg used to be, so that means I had to paint more background to cover it up.

10 Trial and error

Sometimes you get into the 'zone' and just keep on painting. Here, I was in the zone painting the dad and mum's faces. I thought that I was doing fine until I checked against the previous version and realised that the older one looked much better. The newer version had more detail, and was technically more accurate, but remember this advice: it's always better to err in the name of aesthetics, than to look ugly for the sake of technicality.

11 Body shapes

I gave the dad glowing runes on his sword and a bit of a glow trail. I also cleaned up dad's entire body. I painted in clean, flat colour bases for various parts of his outfit, so I could start painting in the decorations and patterns. I also painted his leg armour. At this point, I felt a bit insecure about the way the mum's legs were lit, so I had my wife pose for me and took some reference photos, and they definitely helped a lot.

I had put off painting the baby since the beginning, because I had never painted a baby before. I began by studying a bunch of baby photos on the internet, and made some mental notes. Among the points I noticed were that babies have really large

Layer system

Although I hate having too many layers, I try to keep them separated for as long as my sanity can take. This is especially important for complex paintings with layers of background, middleground, foreground and so on. At the very least, I try to keep the background and foreground on separate layers, because it makes drastic changes much less frightening. However, for simple paintings that aren't elaborate in composition, I prefer working on just one layer if possible – it feels more like painting.

eyes and tiny noses, and their features are all soft curves, bunched together like a cat's. I think I ended up with a pretty okay-looking baby.

12 Decoration

Decorating always takes a long time, because you might paint some intricate pattern for a shirt, or a sculpted relief on some building, and then decide that you hate it. You'd have to go back to the drawing board and come up with a new design. In this case, I painted patterns and sculpted relief for dad's armour. The carved wolf's face on dad's belly armour plate was a spur-of-the-moment idea, which I think works well. I also spent some time refining the parents' muscle definitions and skin, and getting the lighting consistent

13 Consistency

After the above step, I had to do some more refining for consistency in values and lighting on mum and dad, finish their hair, and add more design elements to mum's outfit; she had seemed too plain next to dad's fancy outfit. For painting the ground, I went for a new approach – I just randomly applied any colour that was remotely suitable for autumn colours, then used various blending brushes in *Painter* and tightened them together.

14 Rough him up

I noticed that the shape of one of the clouds happened to mirror the shape of the scythe in the foreground. I decided I had to adjust the cloud shape so there wouldn't be any weird or obvious tangents. I then started to paint in the grass in the darkest value first. Dad looked a bit soft, so I roughed him up by giving him a five o'clock shadow using one of the bristle brushes in *Painter*, and some loose strands of hair on the forehead.

15 Grass layers

I painted the second layer of grass with a different value and colour. Then I added more layers of grass, ending up with something like ten layers of grass with different values and colours. I had to carefully keep track of which ones were behind the family, and which ones were crushed underneath their feet.

To paint the cast shadows from blades of grass, I began by collapsing all the grass layers. Then I copied that layer on to the clipboard, undid the collapse, pasted in the clipboard, turned that layer into a single earth toned Multiply layer at 50% opacity, then transformed it so that it sat at the angle the sun was shining from.

For better control of lighting consistency I had to isolate each grass layer and either add shadows or highlights. I also decided to add some fallen leaves. I chose to paint only one leaf, then I duplicated it many times in different colours and orientations. I treated the leaves with an eraser to give each one a more unique shape.

16 Never-ending story

Below is the finished painting... or maybe not. I always find things to change or add after I've decided that a painting is finished and the signature is signed. This time, I realised that the mum and dad looked too clean, so I gave them some bruises, blood stains, dried mud and cuts.

One of my favourite parts of finishing a painting is finally being able to collapse bunch layers into fewer layers, or just flatten the whole image – it's similar to when film makers say: "It's a wrap!" or the video game creators say: "Ship it!" I learned some things that I didn't expect to learn while painting this piece. I hope this tutorial reflects the lessons I've learned, and that you've enjoyed reading them. ■

Illustration by Jason Chang [w] www.jasonchanart.com

Gothic beauty

Expertise provided by Jason Chan. See more of his work at [w] www.jasonchan.com.

The components needed to complete this tutorial can be found on the CD, in the Tutorial Files > Gothic beauty folder.

Jason Chan shows you how to create this mysterious and bewitching creature from start to finish, using *Painter* and *Photoshop*

Life is made interesting by the existence of contrasts. Good exists because there is evil; happiness is enjoyable because there is also despair. The same rule applies to art. Simply painting a beautiful woman is fine, but in order to make her look more attractive you need to balance that beauty alongside something dark.

The image I'm going to take you through the process of creating is of an innocent-looking, beautiful girl in a very dark and tainted situation, and uses gothic imagery and heavy shading to conjure up an unsettling feeling in the viewer, thus playing innocence and guilt off against each other.

I often change my process to fit both my mood and the specific image. I believe that a flexible process such as this keeps things intuitive and fresh, which makes it fun. You should always try to have fun while working on your image, no matter how much you might hate it after having worked on it for hours; it shows when you love or hate your art. Also, try to work while you're in a good mood – this will also affect your work. I firmly believe the computer is simply a tool, and that you can paint no better with it than you could learn to paint with any other medium. I was initially taught to paint with oils, I've also worked in acrylics and watercolour, and I've drawn illustrations throughout my whole life. All of this is what really counts when you're making an image.

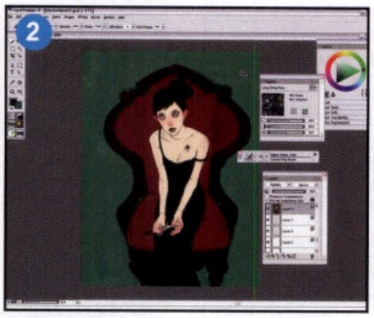
Your artwork is the culmination of all your years of study and hard work. With each new piece you hopefully come up against new challenges and grow as an artist, and practice can only make you better.

1 Sketch

It is important to know what you're going to paint ahead of time, so thumbnails, sketches and studies are always a good starting point for projects. Some people spend more time preparing for a painting than actually painting it, which is no bad thing. The more you plan ahead, the less you'll have to work when actually painting.

2 Base colour

Once my sketch is ready to go, I create a new layer for laying down a base wash of colour. I'm using *Painter* for this step. I select the Coarse Mop Brush – this gives me large strokes that also show paper texture; you can choose a paper texture from your Paper Texture palette. I lay down simple washes of colour to give myself an idea of what I want the colour scheme to be. You can also do this step in *Photoshop*, using a new layer set to Multiply blending mode and any brush you like.



3 Shadows

Now I create another layer for laying down basic shadows. I go with warm shadows because I plan on using a cool light source later on. Light works in contrasts: cool lights/warm shadows or warm lights/cool shadows. Lights and shadows are actually opposite colours, but we don't necessarily have to adhere to this rule – I use light peach for all the shadows. The reason I create the shadows on this layer is so that the difference between light and shadow is the same on every surface, without me having to guess what colour to use.

4 Temperature changes

With watercolour washes, I usually do one more layer for temperature changes. I put light washes of green into the warm colours and warms into the greens, and so on: this helps to unify the image. Make sure that you pay attention to how colours will react. For example, the girl's shoulders are surrounded by the red chair, so light will bounce off the chair, casting red light on her shoulders.

5 Circular oil brush

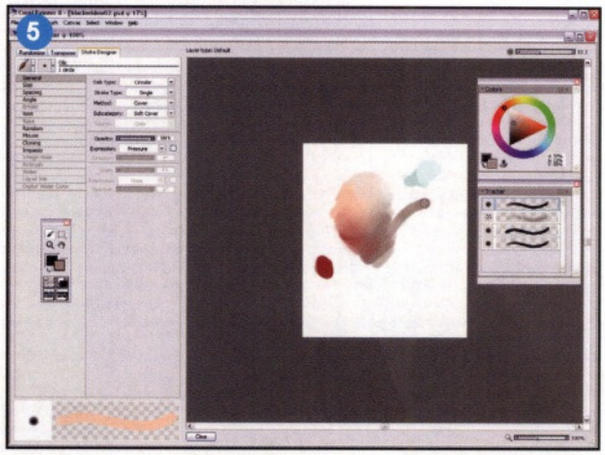
Create a brush for the opaque painting by modifying the Oils Round Camelhair. With the Camelhair brush selected, go into the Brush Creator to change settings. Make sure that the Dab Type is Circular, Opacity is set to Pressure control and that Size control is off.

6 Skin palette

Skin is often misunderstood, and is hard to paint because it is translucent. Use a simple colour palette, and choose a light-blue light source to provide variety – this also adds a cold and mysterious feeling. Painting this is simpler than it looks. First, create a new layer. Start with the local colour, and paint most of the face. Next, add in the shadow shapes with the shadow colour. Using the brush we created, blend between the shadow colour and base colour to create a variety of shades. Next, add in the warms for the nose, ears and cheeks. Finally, take a light colour and gently add that, keeping

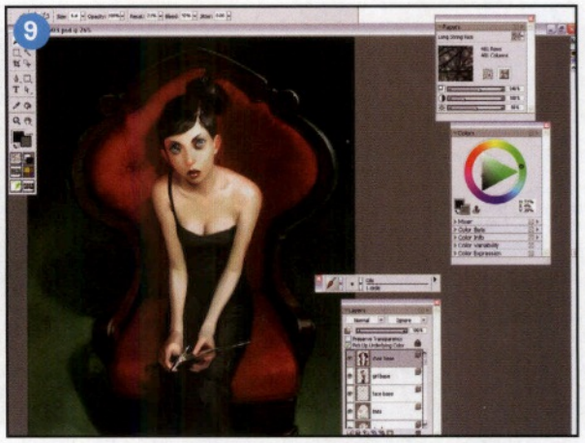
Multiple saves

Be sure to save often, and save multiple versions. Sometimes your computer can crash while saving, which can destroy the file, or the file itself can become corrupted. A less tragic problem is when you do something you can't undo and you want to go back to a previous state. So save regularly – you can always delete the extra saves later.



Shortcuts

Undo/Redo in *Painter 8*:
Ctrl+Z (PC), Command+Z (Mac)
Ctrl+Y (PC), Command+Y (Mac)
Use these shortcuts to quickly compare before and after versions of your work.



one spot of the head brighter than the rest: this will give a sense of the entire head as a shape. Be careful to never mix your light and shadow colours together, and keep the lighting consistent. You can also add reflect lights into your shadows, which add form to shadow areas. They are darker than the light source, but never darker than the shadow. Never add lights, including reflect lights, that are darker than the local colour. Light sources only make things brighter, so a red light on white skin will not make white red.

7 Opaque base

Use in this method to paint the entire body and dress in opaque colours, covering the under painting and outlines. If you are having trouble with any of your lighting, anatomy, forms or pose, don't be afraid to model it in a mirror, take a photo or have a friend model for you. Try to avoid copying directly from the photo, but use the forms and observations to make your own work look better. Don't be a slave to references.

8 Surface variety

Start painting the chair opaquely on a new layer. Note how I've tried to mimic the look of finished wood. I have strong highlights (again in light-blue for consistency), and stronger reflected lights. Think about what objects are made of when lighting them. The wood on the chair behaves differently from the cushioning, for instance; the cushioning is softer and doesn't have bright highlights. The dagger, on the other hand, is reflective and very shiny. All these are different from her skin, which is soft and glossy. Her dress is less shiny than her skin, but not as soft as the chair cushion.

9 Chair clean-up

Go back over the chair to define its edges more clearly. I don't render my work in a super photorealistic way, so there are still some loose brushstrokes in there. If you like, you can keep on painting until it looks real. I'm still using the Custom brush.

10 Chair pattern

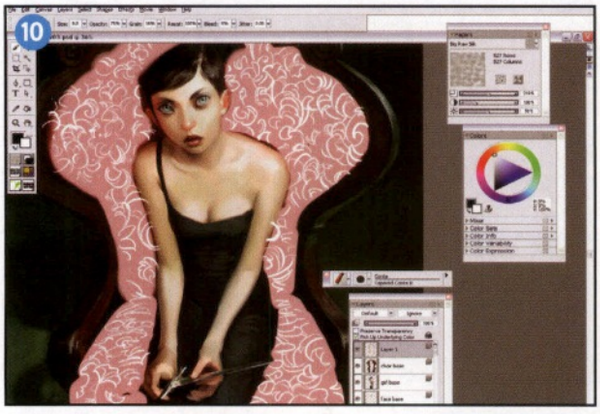
To add a suggestion of pattern to the chair, create a new layer. The layer should be set to Multiply to apply the pattern to the chair. Note that you can only darken the chair on a Multiply layer. If you want to add lighter areas, you'll have to go back and lighten your chair, or paint on a new layer, later. You can take your time and make a really nice pattern, but I've just done a quick pattern for demonstration purposes. This is what the pattern looks like with the layer set to Normal/Default. Pretty ugly, right?

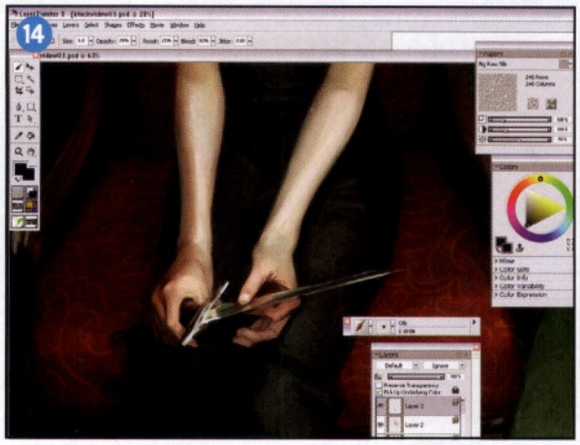
11 Chair pattern multiply

Now turn the layer that the pattern was on back to Multiply. Make numerous tweaks to this until you're happy with it. You can easily change the pattern later if you like.

12 The face

Go back through the image to clean things up some more. Start with the face — I'll talk





Less layers

Layers are great, but they're not always essential. Don't be a slave to your layers. I sometimes create entire paintings on just two layers. Sometimes it's liberating, and feels more like working with real paint. Simply paint on layer one and, when you like it, merge it down to the canvas. Then, when you paint something new, create layer one again, and likewise merge it down when you're done.

a little about her face in general. I wanted her to be innocent, yet scary. This is a normal convention of mine. I do this with large eyes and small lips. I also use almost child-like head proportions, and tend to space the eyes widely, and make them opened wide.

I do not normally paint the stereotypical beautiful face; I like to change it, and to make it mine. Find out how you like to paint your own faces and it will give your work a unique flavour. I suppose mine are almost anime-like.

13 Clean up

I don't know if you can see the difference, but I'm slowly cleaning up her body. I'm not aiming for a tight finish, but nothing too loose either. You can get a very smooth effect easily in *Painter* by using the Blending tools. I like the Just Add Water tool. I don't use it so much in this image, but it's good for when I want a smooth finish.

14 Hands

Hands are difficult to illustrate. Each one of them is just as complicated as drawing the entire human body, complete with its own set of limbs. I highly recommend using references for hands – photos aren't hard to find, or you could use a model.

15 Hair

Hair can be tricky. Painted strands can become too busy very quickly, and they don't always look good. Paint hair in masses. First, put down the darkest colour over the whole shape, then layer lighter shapes on top. Finally, add a few loose strands for detail.

16 Black widow

I decided early on that I wanted a black widow spider in this image – let's make it sexy, scary and disgusting all at once by making it crawl up her chest! Remember, creating something scary or disgusting can make your beautiful elements even more beautiful in contrast.

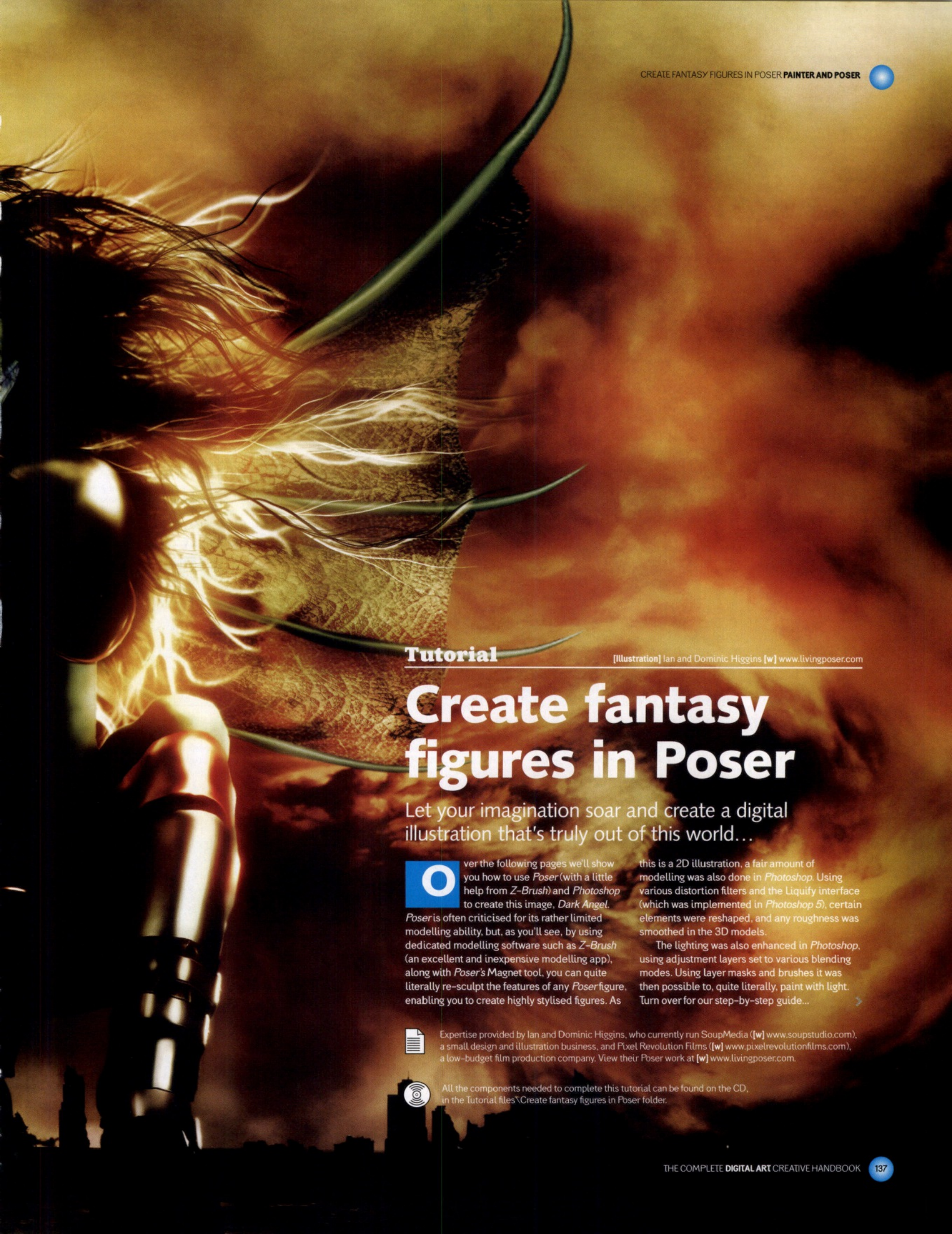
17 Tinting

It's going well, but the image should be a bit colder, and less friendly. I create a new layer and bring out the digital watercolours again. I put washes of blues and greens over the image, which gives everything a cold tint. The mood looks better, but it's getting a little too dark.

18 Finishing the image

The image is almost done. I just want to bring out some of the highlights a little more. To do this, bring the image into *Photoshop*. If you have been working in *Painter*, you need to change all of the Gel layers to Multiply. These were all the layers that were used for watercolours. Then save the file as a PSD.

Photoshop is great for applying the finishing touches to your work. Create a new layer, and set it to Color Dodge. This layer enables you to paint in lights. Use fairly low value colours for this, and use cool colours to intensify the highlights around the image. Be fairly loose, and let the strokes bleed-out beyond the highlights to create auras of light. After affecting different areas with colour lights, the image is complete. ■



Tutorial

[Illustration] Ian and Dominic Higgins [w] www.livingposer.com

Create fantasy figures in Poser

Let your imagination soar and create a digital illustration that's truly out of this world...

Over the following pages we'll show you how to use *Poser* (with a little help from *Z-Brush*) and *Photoshop* to create this image, *Dark Angel*. *Poser* is often criticised for its rather limited modelling ability, but, as you'll see, by using dedicated modelling software such as *Z-Brush* (an excellent and inexpensive modelling app), along with *Poser's* Magnet tool, you can quite literally re-sculpt the features of any *Poser* figure, enabling you to create highly stylised figures. As this is a 2D illustration, a fair amount of modelling was also done in *Photoshop*. Using various distortion filters and the Liquify interface (which was implemented in *Photoshop 5*), certain elements were reshaped, and any roughness was smoothed in the 3D models.

The lighting was also enhanced in *Photoshop*, using adjustment layers set to various blending modes. Using layer masks and brushes it was then possible to, quite literally, paint with light. Turn over for our step-by-step guide...

Expertise provided by Ian and Dominic Higgins, who currently run SoupMedia ([w] www.soupstudio.com), a small design and illustration business, and Pixel Revolution Films ([w] www.pixelrevolutionfilms.com), a low-budget film production company. View their Poser work at [w] www.livingposer.com.

All the components needed to complete this tutorial can be found on the CD, in the Tutorial files\Create fantasy figures in Poser folder.

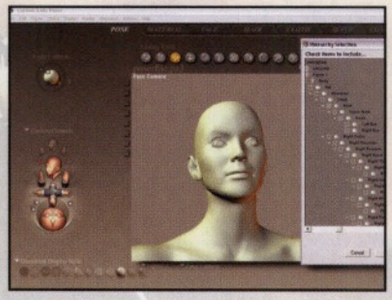
Part 1: The modelling

Begin the project by building an alien using *Poser* and *Z-Brush*...

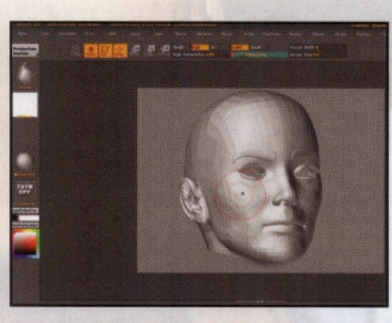
Render engines

Poser 5 introduced the *Firefly* render engine, which is capable of producing far more complex renders than the default *Poser* engine. However, we found that often the default engine produced sharper-looking images, so when you come to render your final image try both, and see which gives the better results.

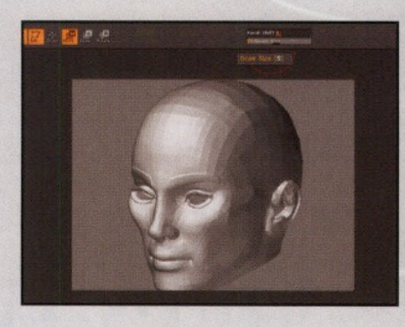
1 For our alien girl, we used the Victoria 2 model as our starting point. However, as the character design called for highly stylised features, we decided to export the head mesh from *Poser*, and bring it into a more dedicated modelling program. Choose Export > Wavefront OBJ.



2 In the Hierarchy window make sure only the head is selected. Name the exported mesh, select a folder to save it in, and then select the As Morph Target option. This enables you to bring the re-sculpted head back into *Poser* as a morph target.



3 For this project we're using *Z-Brush* from Pixologic – you can download a trial from **www.pixologic.com**. Select the Polymesh3D tool from the Tool menu (it's the star-shaped one). Then import the head mesh. To manipulate the head mesh once it's imported, you need to select the Edit button from the menu at the top. A red circle appears, indicating that you're in Edit mode.



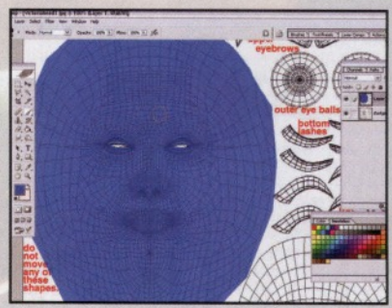
4 Making sure that the Symmetry tool has been selected (from the Transform menu), you can begin the modelling process. Use the Move tool to pull the cheekbones out and lift them higher. The Draw Size option enables you to adjust the size of the tool.

5 It's vitally important, when you're working on the re-sculpting process, to constantly change the angle of your model, so as to check for any tears in the mesh. To change the angle of the mesh, left-click on to an empty space in the window, and keep the mouse depressed.

6 Export the mesh out from *Z-Brush*. Back in *Poser*, apply the new OBJ as a morph target. Then refine the modelling process by manipulating the various morphs built into the Victoria 2 model. Turn the eyeballs and the rest of the body invisible – you should find it easier to work this way.

7 The modelling was taken further by using magnets (Object > Create Magnet). We lifted the magnet to elongate the face and tilted it back slightly. The large circle is the Magnet zone, and by shifting or resizing it you can affect specific areas of the face.

8 With most of the facial modelling completed, refit the eyeballs into the sockets. This can be a bit fiddly, so be prepared to spend some time adjusting the settings of each eyeball. You can also apply the anime eye morph that comes with Victoria to enlarge the eyeballs.



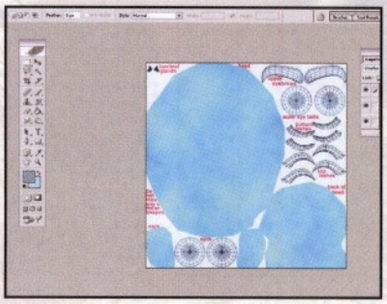
9 Using the free head texture template from Daz (**www.daz3d.com**), create the texture map in *Photoshop*. First, fill in the basic skin colour (blue) and then set to work building up variations in the skin tone. On a new layer, apply the Clouds filter (Filter > Render > Clouds).

Part 2: Texture map

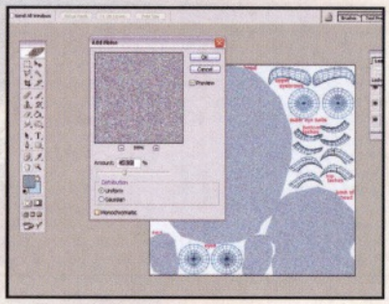
Begin the texture mapping by fleshing out your character...

Camera usage

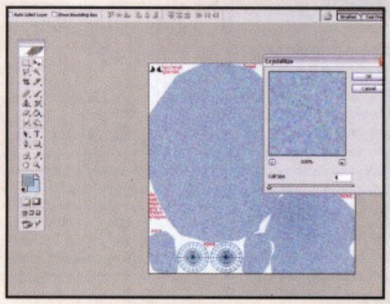
The *Poser* camera works just like a real one, so treat it like one. Play with the lens settings. For example, when working on a portrait, we find a focal setting of between 70–80mm gives the best results. If you use too low a setting, the face becomes distorted; too high and it becomes flat. For the Dark Angel image we used a focal setting of 40mm.



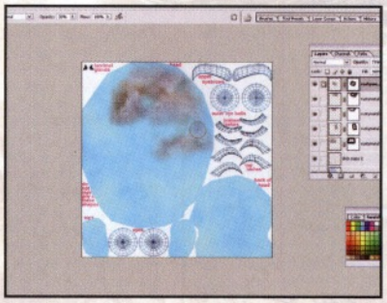
1 When applying the Clouds filter for skin tone, make sure the foreground colour and background colours on the toolbar are set to a darker and lighter tone of the basic skin colour. This layer is then set to Overlay blending mode.



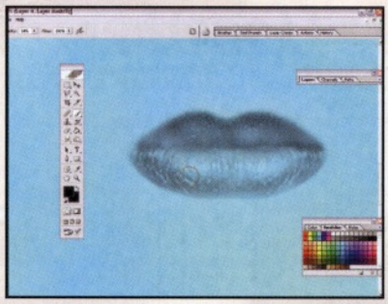
2 Duplicate the base colour layer, bring it to the front and apply the Add Noise filter (Filter > Noise > Add Noise). Set Amount to about 45. Then apply a little blur to soften it using the Blur More filter (Filter > Blur > Blur More).



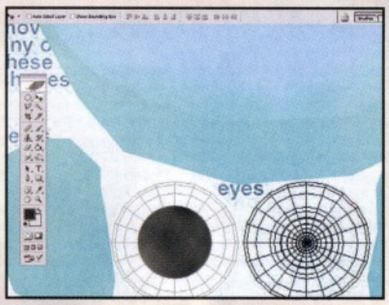
3 Apply the Crystallize filter (Filter > Pixelate > Crystallize) with Cell Size set to around 6. The layer should be set to Luminance blending mode, and the opacity to 15%. Then duplicate this layer, desaturate it (Ctrl/Command+Shift+U) and apply the Find Edges filter (Filter > Stylize > Find Edges). Blur the layer, and reduce its opacity to 10%.



4 We also wanted to give the skin a metallic look, so we found a photo of some rusty metal, dragged it on to the texture map, resized it, and then duplicated the layer several times. We added layer masks to the layers, then brushed away parts of each layer to blend the effect into the skin.

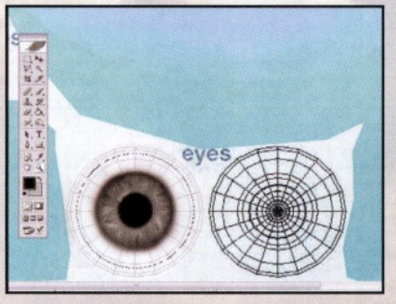


5 Zooming in close, paint in details around the eyes and on the lips. You can use photographic resources again here, blending them in carefully to match the painted elements. Remember though that detail is not vitally important, as you'll be painting in further detail over the rendered 3D image.

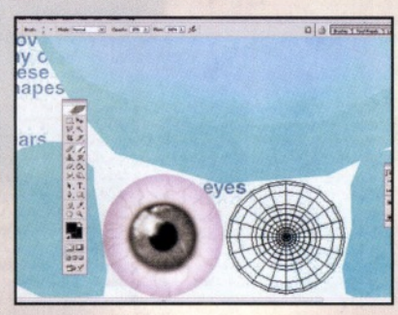


6 The eyes are what really bring your character to life. Change the foreground colour on the toolbar to a dark grey, and the background colour to a very pale grey, then use the Elliptical Marquee tool to create a circle, and apply the Clouds filter to the selection. This will be the iris.

7 With the iris still selected, add some noise, and then apply the Radial Blur filter (Filter > Blur > Radial Blur) with the Blur Method set to Zoom. Now it's beginning to look like an iris. Open the Liquify filter interface (Filter > Liquify), and shape the iris pattern using the Twirl Clockwise Tool.



8 On a new layer, create a smaller circle for the pupil and fill it with black. Then select a larger area around the eye with the Elliptical Marquee Tool, and apply a Zoom Radial Blur. If the selection area is too big, the pupil will become a dark smear.



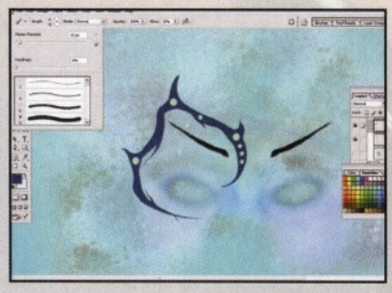
9 Next, work on the white of the eye; we gave ours a purple hue. We painted in veins, then, using the Smudge Tool, we softened them slightly. We also added a reflection to the eyeball, again using the Smudge Tool to soften its edges.

Part 3: Body work

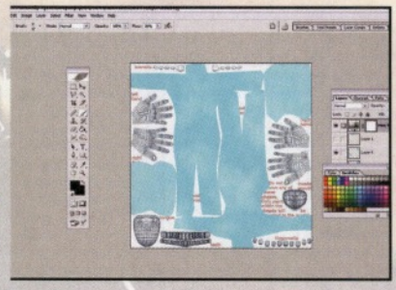
Finish the texture mapping on the face and add armour to the body...

Lighting tips

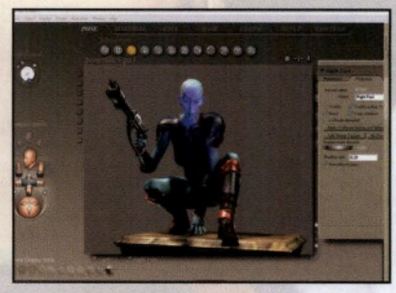
Be prepared to spend a lot of time on the lighting of your scene. Good lighting enhances your models, adds a sense of depth and creates atmosphere. It's well worth reading up on photographic/filmic lighting to learn the basics of good lighting (as well as for inspiration). Don't forget that good lighting set-ups can be saved in Poser's lights library for use in the future.



1 Paint the eyebrows, and begin work on the facial markings. When working on details such as these it's important to constantly check how they look on the actual model. Work with the *Poser* file open at the same time, so that you can constantly render previews.



2 Keep the body texture map fairly simple, blending photographic elements with the digital paint techniques used on the face map. Don't worry too much about seams in the texture map, as these can easily be painted over later (remember, this is a 2D illustration).



3 Back in *Poser*, we kit out our figure in her armour using props downloaded from **www.renderosity.com**. You can find lots of useful free props on sites such as Renderosity. Once dressed and armed, position your model, and set up the camera angle.

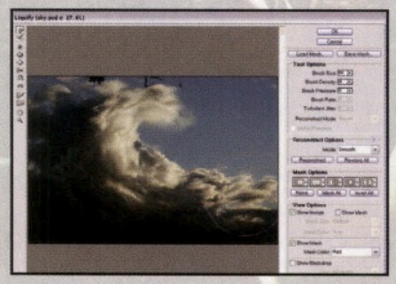
Part 4: Putting it all together

The next stage is to create the backdrop and the 2D elements...

Multi-views

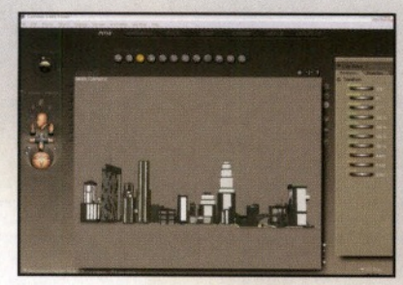
Take advantage of the multi-view function if you're using *Poser Pro* or later, especially in the early stages of modelling. This enables you to have up to four different viewpoints open simultaneously, allowing you to see your model from different angles as you work.

1 Having a good collection of photographic resources to hand can be invaluable when it comes to creating images. To create the dramatic sky backdrop, we blended together several different photographs that we had taken of clouds (you can find these on the CD).



2 Use the Liquify filter to shape the clouds, to create a stronger sense of movement in the sky. Use the Twirl Clockwise Tool (hold down Alt/Option and click to twirl anti-clockwise) and the Forward Warp Tool set to various brush sizes and degrees of strength. Work slowly, making sure not to blur too much detail.

3 Blend the sky layers together, and use a brush to paint in some finer details, such as highlights and shadows that had been blurred. More cloud definition can also be added. The Smudge Tool can be used to help shape the edges of the clouds.



4 Next we want to add a destroyed city to our backdrop. Free models that we sourced online serve as a starting point. There are plenty of high-quality ready-made 3D models available online from websites such as 3D Cafe (**www.3dcafe.com**) and Renderosity.

5 Render an image of the 3D cityscape you've constructed, and in *Photoshop* begin to model the image further. Use brushes on layer masks to paint away parts of the buildings to create the look of a war-devastated city. Details, such as debris, can then be painted in.

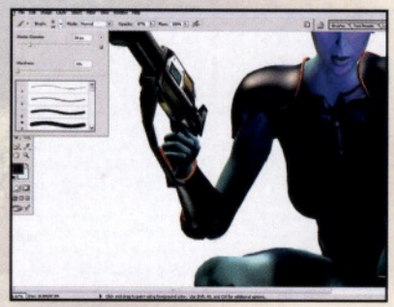
6 We added the city to our backdrop, and then did some further colouring. By applying various Hue/Saturation effects on adjustment layers you can gradually built up your colour scheme. These layers can be set to different light-effect blending modes, such as Hard Light and Multiply.

Putting it all together, continued

Magnetic forces

If you use multiple magnets in your scene at one time, it's a good idea to use the Lock Actor option, which is located in the Figure menu. This will lock your magnets in place, preventing you from moving them accidentally once you have them positioned.

7 In *Poser,* set up the lighting for your 3D figure. Import the backdrop as a background picture, as a reference for the lighting. For high-quality renders, always use high map size settings on your lights, but remember that render times will increase.

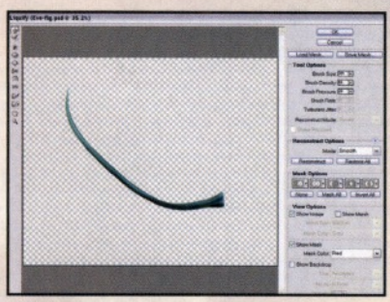


8 Render the figure (we used *Poser's* default render engine) and save the image as a *Photoshop* file. *Poser* automatically renders files with an alpha channel, making it easy to cut out your figures. Then, using a brush with the airbrush option enabled, paint over any imperfections in the model, such as folds in the mesh.

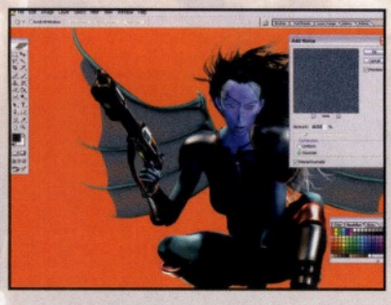
9 Next, begin to paint in the hair. You can use the Liquify filter, and the Smudge Tool set to Darken mode, to shape and model the finer strands of hair and other details. Notice that we've added a colour fill background behind our figure; this was especially helpful when working on highlights.

10 To create the backlighting effect for the hair, first duplicate the hair layers and invert them (Ctrl/Command+I). The highlight layers should then be dropped below the dark hair, and the dark hair should be carefully masked away to reveal the highlights beneath.

11 Using the Smudge Tool and fine brushes, work further on refining the hair and adding in more details, such as the sheen. Work on the highlights further using the Dodge and Burn tools.



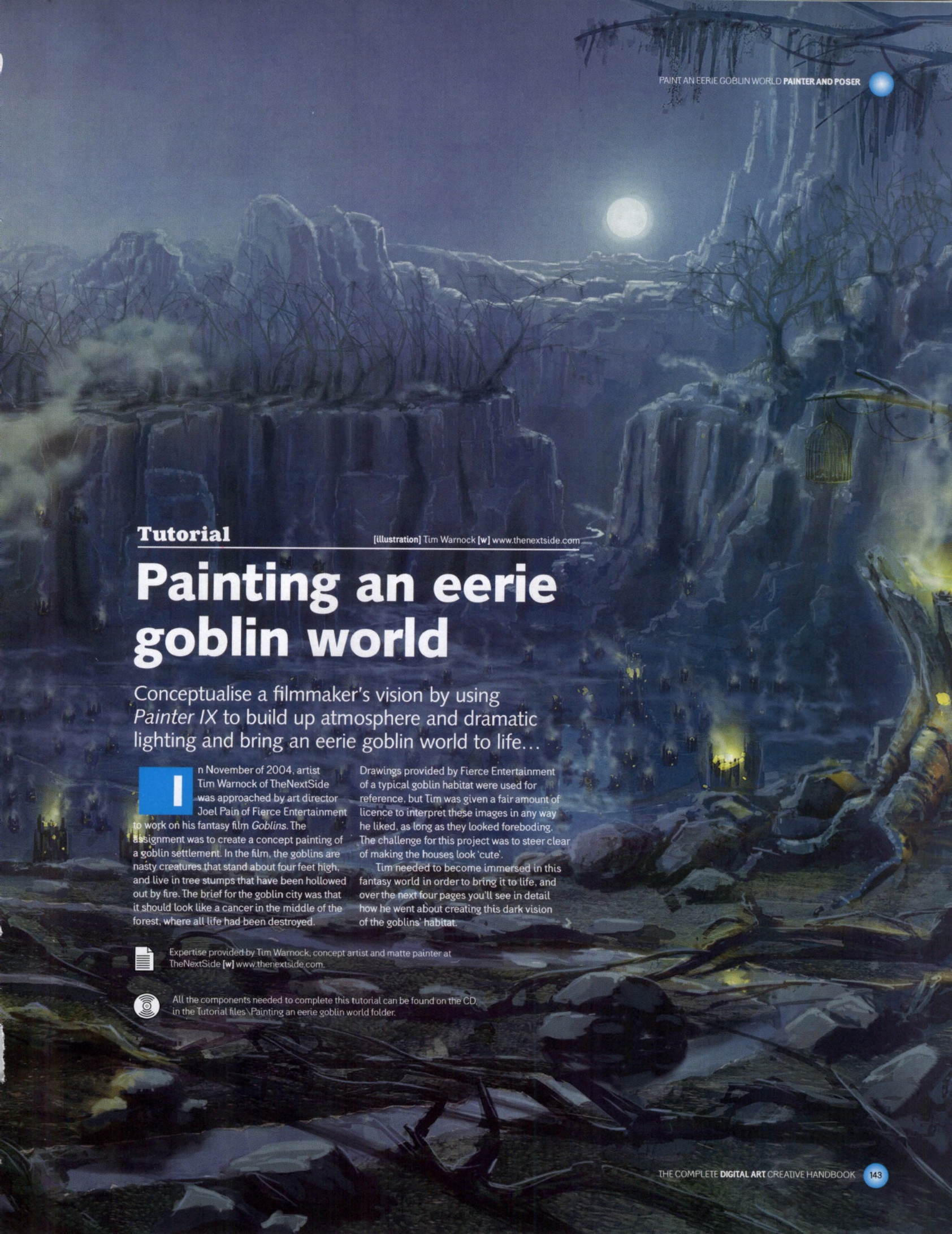
12 Begin work on the wings by first painting in the individual shapes of the bone structures. Some details, such as highlights and shadows, can be added, and then the 'bones' can be shaped using the Liquify filter. Position the individual bones, and blend the layers.



13 Paint in the shapes of the wings. To add a more textured feel to the skin, first add a little noise, and then blur this slightly to soften the texture. Then apply the Craquelure filter (Filter > Texture > Craquelure).

14 To create the look of veins and arteries in the wings you can use a photo of a close-up of a leaf – we built up a texture for our wings using the leaf.tif file included on the CD. The finished texture can then be duplicated several times, and applied in various lighting blending modes over the wings.

15 The completed figure can then be dropped into the main canvas, and the image flattened. You can work further on the lighting effects, such as the hair and the colouring, by using adjustment layers and applying them over the image in various lighting blending modes. ■



Tutorial

[illustration] Tim Warnock **[w]** www.thenextside.com

Painting an eerie goblin world

Conceptualise a filmmaker's vision by using *Painter IX* to build up atmosphere and dramatic lighting and bring an eerie goblin world to life...

In November of 2004, artist Tim Warnock of TheNextSide was approached by art director Joel Pain of Fierce Entertainment to work on his fantasy film *Goblins*. The assignment was to create a concept painting of a goblin settlement. In the film, the goblins are nasty creatures that stand about four feet high, and live in tree stumps that have been hollowed out by fire. The brief for the goblin city was that it should look like a cancer in the middle of the forest, where all life had been destroyed.

Drawings provided by Fierce Entertainment of a typical goblin habitat were used for reference, but Tim was given a fair amount of licence to interpret these images in any way he liked, as long as they looked foreboding. The challenge for this project was to steer clear of making the houses look 'cute'.

Tim needed to become immersed in this fantasy world in order to bring it to life, and over the next four pages you'll see in detail how he went about creating this dark vision of the goblins' habitat.

Expertise provided by Tim Warnock, concept artist and matte painter at TheNextSide **[w]** www.thenextside.com.

All the components needed to complete this tutorial can be found on the CD, in the Tutorial files\Painting an eerie goblin world folder.

Part 1: Setting up your composition

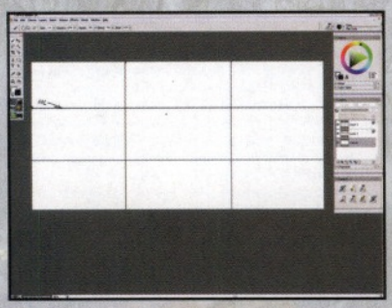
Create a document in *Painter* and start adding colour to your canvas…

Spinning canvas

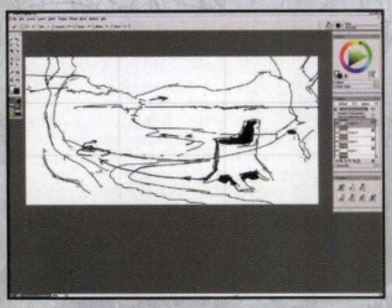
A nice feature in *Painter* is that you can spin your canvas by holding down Spacebar+Alt/Option. This enables you to move your arm on a horizontal axis all the time. Typically the hardest thing about drawing on the computer is that you're not able to spin the page the way you would a sketchbook in real life. Well now you can!

Glow effects

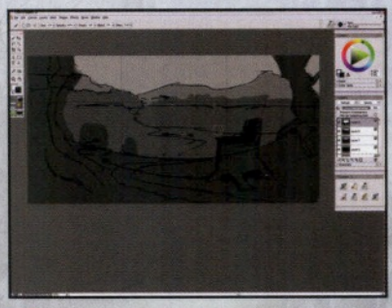
The Glow Brush is excellent for building up dramatic lighting. It lightens and saturates towards whatever colour is selected in the colour wheel: the lighter the colour, the greater the brightness, and the more saturated the colour, the greater the saturation. It's best to start with a dark and desaturated colour, and make subtle adjustments.



1 Begin by opening a new document in *Painter* at 1,000x500. To establish a framework for the composition, divide the canvas into thirds with vertical and horizontal lines. The upper horizontal line will be the horizon line.



2 Using a pen (Pens > Flat Colour), quickly indicate the major scene elements, being conscious of the division of the page. Try to establish a sequence of shapes that will lead the viewer's eye through the image, and avoid any lines that will lead the viewer off the page.



3 Create three new layers, and set their transparency to 30%. Using a 100% black pen, block in the silhouettes of the foreground, mid-ground and background, each on a separate layer. Play with the transparency to establish a good division of tone values.

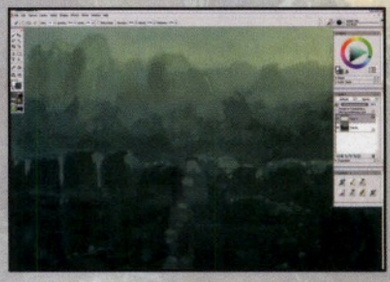
4 Select Artist's Oils > Dry Brush, and begin to block in the painting, sampling from your values on the page with the Eyedropper tool. For the moment, the light source is coming from the right side and it's low to the ground. Keeping this in mind, loosely define the shapes in the scene.

5 Create a new layer, and fill it with a dark, fairly saturated green. Flatten the composition by selecting Layers > Drop All. Choose Effects > Tonal Control > Brightness/Contrast, and boost the contrast and brightness to punch up the lights and darks – dark blues and greens are a good choice.

6 Select all, and cut and paste. Zoom in and align your layers, using the arrow keys to nudge them into place. Add light using the FX > Glow Brush with the colour set to a very dark orange (almost black) and a large size. Vary the hue to divide subtle colour shifts, then erase the dark areas to re-establish the shadows.

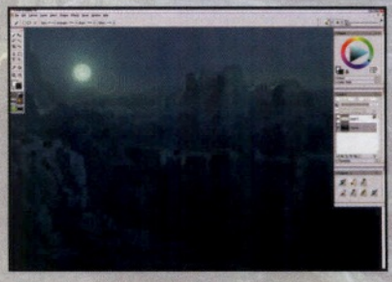
Part 2: Defining shapes and atmosphere

Start to build up detail in your image to create a dark and menacing atmosphere…



1 Select Artist's Oils > Dry Brush, and start to build up detail in the image, again using the Eyedropper to sample colour from the canvas. Keeping in mind the direction of your light source, begin to define highlight and shadow areas.

2 Create a new layer. Select the Paint Bucket tool, fill the layer with a dark blue colour and set the transparency to 30%. Using the Eraser, softly pull back some of the warmer colour on the far right of the canvas to give the effect of the sun rising and creating a secondary light source. This needs to be very subtle. Go to Layers > Drop All.



3 Repeat the process from step 6 above to duplicate the layer. Set the colour wheel to H:84, S:42, V:8. Use the Glow Brush to accentuate the lighting from the moon. Build the intensity of the lighting closest to the moon so that it falls off gradually. Accentuate the faces of shapes that would pick up the lighting from the moon and use the Eraser to redefine shadow areas.

Part 3: Refining your composition

Do some more detailed work on the goblin homes, and add texture and light...

Resizing your canvas

Before refining the composition, resize your canvas to 4,000x2,000 pixels. Working at small sizes initially prevents the computer from getting bogged down. Once the rough painting is done, resize the image so that finer detail can be rendered.

Collect textures

Collecting and saving random textures is a great habit to get into. Carry a digital camera with you, and take shots of textures that inspire you. You can use these to enhance your paintings, and also for reference when working on different lighting conditions.

1 The valley is filled with dozens of little goblin homes. On a new layer, using Artist's Oils > Dry Brush, indicate detail to establish the positioning of each home. Sample colour from the darkest parts of the image to use as your base colour for each home. Choose a desaturated yellow, and dab small dots on the tops of the homes for the glow of the fire inside.

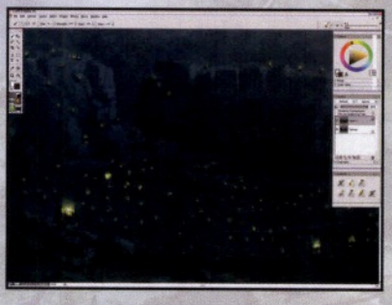
2 Begin to refine the shapes of the goblin homes in the foreground. Make the shapes twisted and gnarled, and add toadstools to some roofs. Using a dark, desaturated red, paint the silhouette of the toadstools and begin to establish some detail on the ground, such as rocks, roots and sticks. Keep all the colours subdued and desaturated.

3 Go to Layers > Drop All. To create light within the homes, repeat the process of step 6 again, and use the Glow Brush to build up yellow and orange beams. The light should catch the rim of the toadstool, and be more intense near the bottom of the stump. Keep the glow of the fire bright yellow, and vary the colour between oranges, reds and yellows. Use the Eraser to redefine the shadows.

4 Open the trees.jpg image from the CD. Go to Select > All, then copy and paste the tree image into your composition.

5 Set Layer Attribute to Overlay, and Layer Transparency to 45%. Using the Layer Adjuster move the layer so that interesting texture is overlaying the foreground elements. Repeat with a new layer containing the trees image to build up texture. Adjust the layer transparency for a subtle effect, and apply Sharpen under Effects > Focus.

6 Using the Eraser tool, remove from the texture layer the darkest areas of the image – for example, the darkest side of the roots and rocks. The final effect should resemble moss on the ground. Refer to Texture.PSD on the CD to see how the layering should look.



7 Go to Layers > Drop All. Repeat the process from step 6 on the opposite page to duplicate the layer. Using the Glow Brush, begin to add luminance to the light in the valley; use the Eraser to push some of the light back. Be careful not to over-lighten the valley, because the houses furthest away would not be perceived as being as bright as those in the foreground. Go to Layers > Drop All.

8 On a new layer, using Artist's Oils > Dry Brush, begin to define rim light on the edges of the trees and rocks in the foreground. It's important to not use the Glow Brush or Air Brush for too much of the lighting, but to sometimes use a hard-edged brush to render more defined edges. Sample colour from the far side of the valley with the Eyedropper to get the colour for your highlights. Use the Eraser to push back any highlights that are too prominent.

9 On a new layer go to Cloners > Straight Cloner, and sample from the sky by holding down Alt/Option. Paint over the river bed, repositioning your cloned source periodically to create variation, so the water doesn't look like an exact reflection of the sky. Using Blenders > Smear, push some of the river around to create ripples. Erase out of the river layer to clean up the edges of the river bed and uncover branches – refer to Texture.PSD on the CD.

Part 4: More details

Now add more details to the background, mid-ground and foreground of your composition…

Flipping your canvas

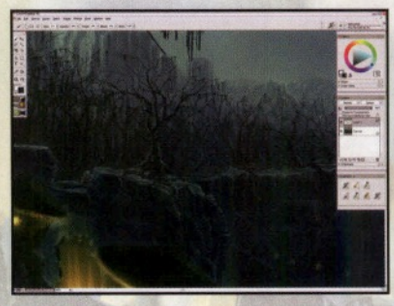
The eye gets used to looking at things over time, and it becomes easy to miss problems with perspective. By flipping the canvas the eye is forced to re-evaluate everything, so make a habit of flipping your canvas occasionally to catch perspective issues as they arise.

1 Resize the canvas to 6,600x3,300 pixels. Go to Effect > Focus > Sharpen, and set the amount to 3. Working with the Glow Brush a lot tends to soften the image, and periodically running a Sharpen filter brings back some detail.

2 Create a new layer, and use the Eyedropper tool to sample from the lighter parts of the sky around the moon. Using Artist's Oils > Dry Brush, begin to define the highlights across the tops of the rocks. Then sample from the midtone parts of the rocks and sharpen up the faces of the rocks, creating shadow, midtone and highlight areas.

3 When painting elements of the background, paint over the foreground elements such as tree branches. Once you've finished, reduce the opacity of the background layer enough to see the elements you've painted over. Use your Eraser to make the foreground elements visible again, then bring the opacity of the background back up to 100%.

4 Create a new layer. Sample with the Eyedropper tool from the darkest areas of the image, and, using Artist's Oils > Dry Brush, roughly paint in a tree line. When you're satisfied with the position and scale of the trees reduce the layer opacity to 50%. Create a new layer, and draw more defined trees in front.



5 In another new layer create a few trees with even more definition; the viewer's eye will be drawn to these, giving the image a greater sense of depth. Sharpen the rocks closest to the cliff edge by adding some sharp highlights. Sample the shadow parts of the rock, and add cuts and crevices that will create a more random and organic look.

6 On a new layer repeat the cloning process in Part 3, step 9 to create the river running through the bottom of the valley. Be conscious of where the light from the moon would fall on the river, and where the shadow from the rocks would cause the river to appear darker. Clean up the edges of the river with the Eraser tool.

7 On a new layer, begin to add detail to the goblins' houses in the foreground. Play up the detail that was created by the overlaid textures, bringing out edges by accentuating highlights and creating cuts and twists in the roots by accentuating shadows. Again, be conscious of the different light sources in the scene, and the temperature of the light they cast.

8 Use the Artist's Oils > Dry Brush on a new layer to create a small cage hanging from a branch protruding from the goblin's house. Begin by defining a silhouette of the cage, then give it dimension by adding cool highlights to the faces that are lit by the moon, and warm highlights cast by the fire's glow inside the goblin's house.

9 Go over the ground plane in the foreground, and clean up objects that are too soft. On a new layer, sample from the image and sharpen up edges on rocks and highlights on roots. Add shadows cast by the rocks to make them look like they're sitting on the ground. Again, use the texture and the image to find details, and push it back in places if necessary.

Part 5: Shadow and light adjustments

Play around with the shadows in the composition and get the overall lighting right...

1 Go to Layers > Drop All. Duplicate the layer. On the side of the valley closest to camera, use the Glow Brush to create a bluish light cast. Erase what would be the shadow cast from the wall on the far side of the valley as well as the goblin houses that sit in the light. Also erase an indication of the trees on the top of the valley wall. Vary the opacity of the Eraser when adding the tree shadows so that the shadow isn't too sharp. Go to Layers > Drop All.

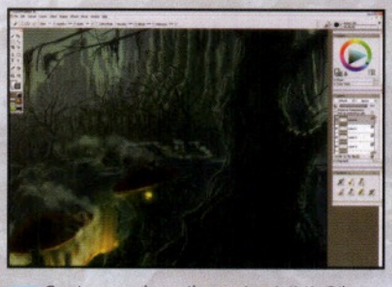
2 Sample the darkest part of your image with the Eyedropper. Using the Air Brush > Fine Tip Soft Air 50, darken the crevices in the rock of the valley wall on a new layer. Then use the Eraser to sharpen the edges of the crevices. If the crevices appear too prominent, simply reduce the opacity of the Eraser tool to 10%, and lightly dab here and there to push back areas that look too strong.

3 Using the Air Brush, create cast shadows from the trees. Use the Eraser to sharpen up the edges of the shadows and push back any parts of the shadow that appear too strong. Also darken the shadow side of the tree trunks where needed. Depending on where the tree is sitting, be conscious of sampling from the shadow areas around that tree so that it makes sense within the space that it's in, and isn't too dark or too light.

4 Create a new layer. Use the Eyedropper tool to sample from the light blue colour of the distant hills. With the Air Brush > Fine Tip Soft Air 50, begin to shape smoke coming from within the houses; consider how the smoke would hit the underside of the mushroom and curl around it. In the Layers palette, select Preserve Transparency. Make the colour lighter, further towards yellow. Using the Air Brush, lighten the smoke that's closest to the light.

5 Turn Preserve Transparency off, and create a new layer. Sampling a colour from the distant hills again, create puffs of smoke rising from the goblin houses in the valley. Use the Eraser to push back the smoke furthest away, and to define edges in the smoke so that it doesn't look too soft. Repeat the process in the previous step to lighten the portion of the smoke closest to the light.

6 To create a ground haze add a new layer. Using the colour sampled from the distant hills, paint with the Air Brush to form tongues of smoke. Making smoke believable entails creating a balance of soft and hard edges, as well as creating luminance where light hits it, as it's semi-transparent. This is accomplished with the same process as in step 4, turning on Preserve Transparency and playing with the lightness and darkness – see Smoke.PSD on the CD.



7 Create a new layer, then, using Artist's Oils > Dry Brush, and sampling the highlights in the valley walls, define the edges of the foreground trees to accentuate the texture in the bark. For the moon-side of the trees sample from the cool lighting in the image, and for the side of the tree facing the rising sun, sample the warm lighting.

8 Go to Layers > Drop All, then create a duplicate layer. Use the Glow Brush to add subtle glows cast from the light within the goblin houses. Areas to note are the smoke rising out of the houses, the edges of the roofs, and the walls of the houses. Use the Eraser to sharpen up edges that have been softened by the Glow Brush.

9 Go to Layers > Drop All. Once again, use the Glow Brush to create bloom or light glow from the rising sun. The light is coming from off-camera, and cutting through the tree branches and the mountain on the far side of the valley. Vary the colour between oranges, reds and pinks to give volume to the lighting. Gently erase the shadows cut by the tree branches. Finish off by accentuating the beam of light with the airbrush – see FinalLighting02.psd on the CD. ■

[Illustration] Marta Dahlig [w] www.blackeri.com

Paint a realistic face

Expertise provided by Marta Dahlig. See more of her work at **[w]** www.blackeri.com

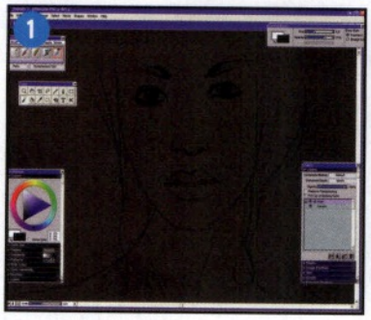
The components needed to complete this tutorial can be found on the CD, in the Tutorial Files\Paint a realistic face folder.

Marta Dahlig introduces you to the essentials of face painting, from creating the initial sketch to final colouring...

It's best to learn a few basic steps if you want to paint a realistic face, and once you've grasped these you should find that your images take on a new quality. I'll talk you through the creation of this image, called *Cherry Blossom*, and explain some essentials, such as choosing, mixing and applying colours, and using highlights. I'll also point out some of the differences between particular brushes, their specific advantages in creating textures, and the importance of choosing appropriate brushes for every element of your artwork.

To follow the steps, and make the best use of this tutorial, you should have a basic knowledge of *Painter*, *Photoshop* or another painting program, own a tablet and have a general idea of human anatomy. I've created the tutorial image using *Painter 7*, with the Tinting brush set imported from *Painter 6*. However, it's possible to achieve the same effects in any version of *Photoshop* or *Painter*, so I've included some tips on painting in those programs.

Remember that there are many ways to achieve certain effects, so you don't need to worry about following my steps exactly. There is no one right way to paint, so be creative, and feel free to experiment as much as you want – this tutorial is meant as a guide to help you develop your own unique style of painting.



1 Ideas stage

The key to successful painting can often depend on having a good idea to start with, so try to spend at least a few minutes on designing and polishing the concept. Think about the character, suitable colours, and the atmosphere you want to create.

Once you have a clear image of what you want, create a new file. It's best to work at a size that's at least twice that at which your picture will be viewed. If your computer can handle it, try to paint at print-quality resolutions of 200–300dpi or more.

Choose a background colour that's not too saturated. Create a new layer, and sketch the basic look of your character by marking the position and shape of the eyes, nose and lips. It doesn't really matter what tool you use, so choose the one you feel most comfortable with. We need these lines for a few steps only.

2 Contours

This step is recommended if you don't feel confident about defining light sources and shading. A human face isn't flat, so using these markings will help you understand its structure. Create two new layers on top of your sketch. On the first one, mark the convex areas of the face (red lines). These include the eyebrows, cheeks, tip of the nose, lips and chin. On the second layer, define highlights according to the chosen light source.

Shading is easiest when you place the light source somewhere in front of your character – in this setting the most convex areas are also the most highlighted. Sketch rays of light (arrows), and mark the lightest areas (irregular white shapes) accordingly. If there is light, there must be shadow, so make the convex areas cast a shadow (dark lines) on the face.

3 Colour blocking

On a new layer, block out some colours to use throughout the painting process. Go with the basic round brush from the Tinting set, or a smeary round brush from Tools > Palette Knives (*Painter*) or choose a hard round brush with varying opacity (*Photoshop*). Create a new layer under the initial sketch, and use your new palette to block out the main skin colour – make this a midtone. If you're a beginner, choose a typical flesh colour.

Now apply basic shadows of a tone slightly different to your midtone; use your light source sketch to help you. Don't pay too much attention to the highlights yet. Avoid using airbrushes in *Painter* or soft round brushes in *Photoshop*. Also, avoid shading with a darker version of your midtone. The human face is made of many colours, so change both the hue and the brightness of your colour. Make it more red, for example – it makes a big difference.

4 Shadows

Deepen the shadows, especially around the eyes. For more dramatic effects, create a strong contrast between the lightest and darkest areas.

5 Colour blending

Turn off the Sketch layer using the eye icon in the Layers palette (*Photoshop* or *Painter*). Don't delete this, or the convex and lighting lines, however – you never know when you might need them! Now it's time to start blending all those rough colours. First, soften the rough borders between light and dark areas by applying colours with a low opacity brush on top of the edges. *Painter* fans can mix colours smoothly with the fantastic Blender brush from the Tinting set; it saves a lot of trouble, and adds texture.

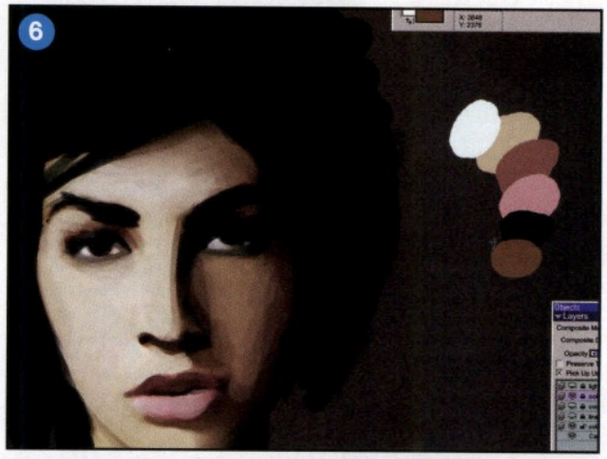
Photoshoppers can use a low-opacity (15–30%) hard round brush. Avoid the Smear/Smudge tools though, because they will take away the texture.

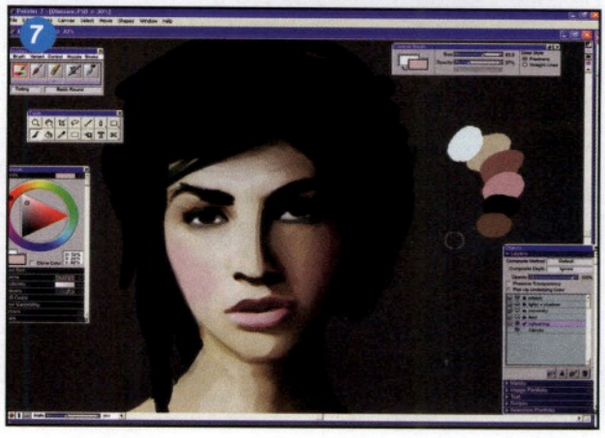
6 Features

Continue blending, and start marking subtle highlights – a light turquoise applied with a low-opacity brush is fantastic for this. The transition between colours should become smoother. Now start defining the facial features. Perfect the mouth shape, and remember that the upper lip is less convex (darker). Define the eye shapes by marking the upper and lower eyelids, but try not to define the eyes with dark lines, or they will look cartoonish. Keep your brushstrokes smooth and tidy and avoid highlighting skin with pure white, because this looks waxy.

Brushes

It's not sufficient to use just one brush type for your artwork. You should switch between different kinds constantly to achieve good results. An airbrush is useful for painting hair and detailing, but will probably fail to create a decent skin texture. Hard brushes give a lot of texture, but aren't very good for blending.





Shortcuts

Color Balance command: Ctrl/Command+B
This shortcut opens the Color Balance dialog in *Photoshop* – it's fantastic for quickly correcting a colour palette.

7 Tones

Pay careful attention to your colours. If you feel that the face is missing a shade, add it. Experiment with tones – try adding and blending reds, blues or greens to enrich the colour palette. When you feel that you've achieved the skin tones you desire, move on to the next step.

8 Texture

Your work should now start to look more realistic. In *Painter*, choose the Blender brush; alternatively, in *Photoshop*, pick a speckled brush. These brushes are made of dozens of dots, and when they're applied with patience, at a low opacity, they blend perfectly and give a fantastic texture. If you haven't defined the hairstyle for your face, sketch it out now. Do this on a separate layer, so you can easily change it later.

9 Airbrushing

Now the transition between colours should be getting quite smooth. After creating enough texture, you can use some non-texture brushes, such as an airbrush in *Painter* or a soft, round one in *Photoshop*. Apply some low-opacity strokes to soften the rough areas of the face, but be careful, because you can easily make the skin look artificial. You can also add a small round highlight to the iris at this point to give your character some life.

10 Eye shape

Now let's concentrate on the eyes. An eye is a ball, so both ends of it will be a bit darker than the centre. Dim the corners, especially the outer ones. Sketch out a round iris in a colour; remember to mark the pupil. Irises are made of dozens of tiny lines spread between their edges and the pupil – draw these with a small opaque (85–100%) airbrush. Feel free to make some lines darker, lighter or thicker for an interesting effect. Add a small highlight on the upper lid to underline the fact that it's also rounded.

11 Eye tones

Spend some time adding further detail to the iris. Dim it at the edges, and add some dots, sparks and hints of other colours; irises usually consist of a few tones. Then work on the eyelids, defining their shape and adding highlights, especially in the middle section. Remember to mark the pink flesh of the eye.

12 Lashes

Create a new layer, and add some eyelashes using the Airbrush tool. Paint them a bit too long, so that you can later soften their edges with a soft eraser – for realistic painting it's crucial to remember the tiniest details. Add a small highlight just outside the inner corner of each eye.

13 Smoothing

Accentuate the roundness of the nose tip by adding some shadow to the bottom of it with an Airbrush. Highlight it with turquoise at the centre. Smooth the whole nose with a Blender brush, and add a subtle highlight.

The lips still need a lot of work. To shade them, use a basic round brush and Blender (*Painter*) or a hard round brush (*Photoshop*). Apply shadows to both edges of the lips, and add a darker hint at the centre of the lower lip. Add two highlights on both sides of this shadow. Make the centre of the upper lip slightly lighter than the sides.

14 Attitude

If you want your lips to have more attitude, darken them. To do so, create a layer on top of the lips, run a pink airbrush over the lips, and set the layer's mode to Multiply. If you

Layers

Layers are one of the main benefits of digital painting, but they shouldn't be overused. Too many layers in your file will slow down your computer, and probably disturb your workflow. Layers can also make your work look artificial, or copied and pasted. Try to keep key elements, such as the face and eyes, in one layer, but feel free to keep a few elements on different layers for easy editing.

are satisfied with the midtone, it's time to add some texture. Use a basic round brush (*Painter*) or a hard round brush (*Photoshop*) to add some light blocks of colour to the lips. Their size and brightness should vary.

15 Highlights

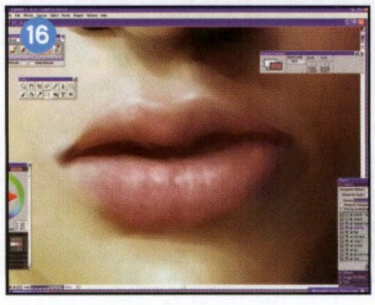
With the same brushes selected, add some lighter blocks on top of the previous ones. This time, make them significantly smaller. Add some highlight to the edge of the upper lip too. You can also lighten the sides of the lower lip, to give the mouth a natural look.

16 Moisture

To finish the lips, select a small airbrush, choose a light colour from the pink palette and set the opacity to 50%. Use it over the lips, making a series of small dots. Now enlarge the tip of your airbrush, and add some subtle highlights to the lower lip, mostly to the top of areas that you highlighted in the previous step. Change the colour to turquoise, and lighten the edge of the upper lip for a wet look.

17 Hair layer

It's time to work on the hair. Remember how important it was to sketch it on a separate layer? Change the layer's opacity to around 50%, so it's still visible but not distracting. Create a new layer on top. In *Painter*, choose an airbrush or a fine point from Inks; in *Photoshop* pick a soft round brush, or a low opacity hard round one, and set the brush to the chosen colour. Beginners should beware of using black hair, because it's hard to add texture and define highlights or shadows.



First, sketch the basic shape of your hair. Try to plan the main wisps carefully and precisely, as once you start shading it's hard to fix mistakes. After outlining the flow, pick a colour that will form the basis of your future highlights – don't choose anything too vivid yet. The shade should be just a bit lighter than the main hair colour. Apply some thick, half-transparent strands with a big brush, paying more attention to the areas that are most exposed to the light.

18 Strands

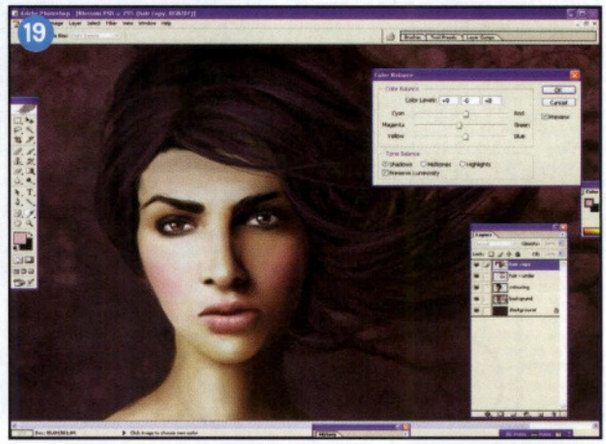
The secret to painting hair is making it seem detailed while not painting every single strand. You have to add detail to the visible areas, and let others fade into darkness; painting every bit will make the hair look artificial. Start by adding details and texture; start applying darker and thicker strands, and move slowly to lighter and thinner ones. Mark the lightest wisps in the most highlighted places only, or else the hair will look flat. If you feel it needs more depth, choose a shade darker than the basic hair colour, and dim some areas. Blend separate strands with a basic round brush (*Painter*) or low-opacity hard round brush (*Photoshop*). To create flowing hair with a sense of depth, add some half transparent strands underneath the existing hair.

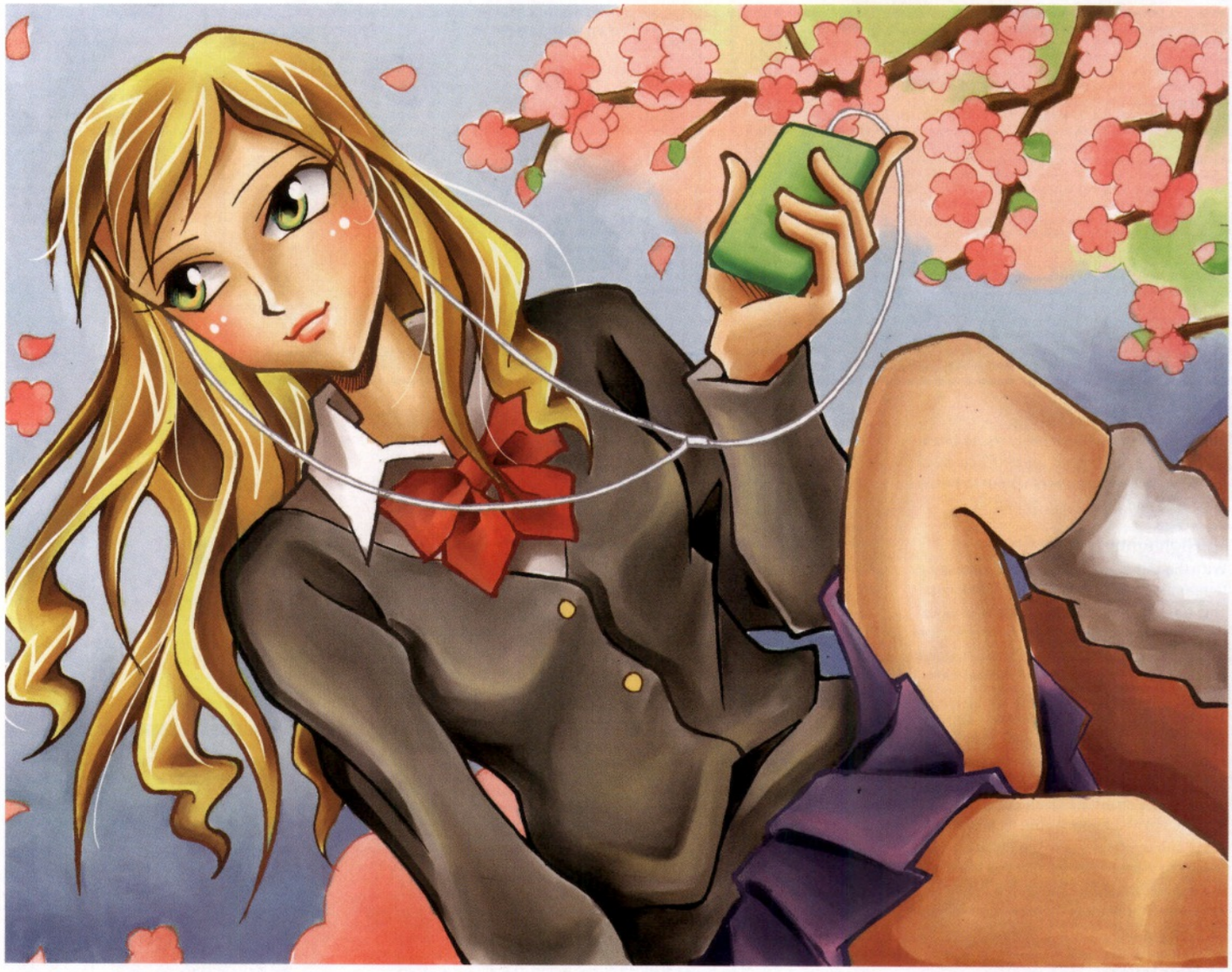
19 Detail

To finish off, paint the background you want. In Photoshop, you can change the skin or hair colour to make everything fit using the Color Balance command. Thanks to this little wonder, you can easily adjust some colours without doing any harm to the existing palette (unlike hue changing).

20 Final touches

For your image to be successful, the character and background must complement each other. Achieve this by adding an element of the background directly to the foreground: here, I've used some transparent petals and a flower in the woman's hair. Once you have created a full scene, consider yourself done. Take one last critical look at the piece, and back-up the file on your hard drive. ■





[Illustration] Joanna Zhou [w] www.chocolatepixels.com

How to draw Manga

Expertise provided by Joanna Zhou. You can see more of her work at [w] www.chocolatepixels.com

The components needed to follow this tutorial are on the CD, in the Tutorial Files\How to draw manga folder.

Joanna Zhou explains the basics of creating an illustration in this popular style using *Photoshop* and *Painter*

This tutorial guides you through the process of drawing and colouring a manga picture. Manga artwork often suffers from the unfair criticism that it all looks the same. Although there are general stylistic conventions, every artist interprets these differently, creating a host of unique styles. The more you draw, the faster you'll discover your own style, both in terms of character design and colouring.

The colouring process outlined here was carried out in *Photoshop CS* and *Painter IX*. I also used a graphics tablet, which is an invaluable tool for anyone who's serious about creating digital art. Wacom tablets often come with a free version of Painter Essentials, and although it's not as good as the full version, the effects demonstrated in this tutorial can be recreated (with a bit of practice) in that application.

I like to sketch and ink by hand, and then scan the outlines, and colour them on the computer. Great care should be taken over the sketch, because it forms the backbone of your work. Even the best colouring technique won't be able to salvage a poor, out-of-perspective drawing. When sketching, I check for mistakes in terms of perspective and orientation by holding the drawing up to a mirror. Inking is done in black ink, with a thin fineliner or nib pen.

When working digitally, my files will most likely be in PSD format (to support layers). The final image is then flattened, and saved as a TIFF or JPEG (at a minimum of 300dpi). TIFF is better quality for print, while JPEG offers very small file sizes, making it suitable for pictures destined for the web.

1 Style conventions

I begin by sketching out the image using a 2B mechanical pencil. I use a putty rubber, because regular erasers can damage the paper surface and leave dust. A good trick for creating an instant, dynamic composition is to use a simple pose, but draw it with the paper at an angle. Some manga guidelines to bear in mind are the conventions for mouth, eyes and hair. The mouth is kept very small, like a rosebud, particularly when you're drawing female characters. Eyes are definitely the number one manga trademark. They should be large and expressive, with graceful eyebrows and lashes. I like to draw hair as thick, almost three-dimensional strands, because I find it a lot easier to colour in later on if I can see where the separate layers of hair begin and end. Female manga body proportions are usually petite, with skinny wrists, tiny waists and thin legs; albeit frequently with large breasts!

2 Scan the image

The sketch is inked with a thin nib pen and drawing ink. I often vary the thickness of the lines to create a feeling of depth. For example, the contrast between the girl's thick outline and the thin cherry blossoms immediately indicate foreground and background. After inking, I scan the image at 300dpi, and open it in *Photoshop* to adjust the contrast. Sometimes it's enough just to go to Image > Adjustments > Auto levels. To gain more control I then select Levels, so that I can manually tweak the contrast. Ideally, you should have a crisp black outline (but not overly jagged), with no traces of pencil. This is now ready for colouring in.

3 Outline work

The outlines are opened in *Painter*. I like to copy and paste the outlines on to a new layer, and set this to Multiply. This enables me to colour freely but still retain the black outlines, which show through. I also keep a completely white layer under the outlines to act as a backdrop.

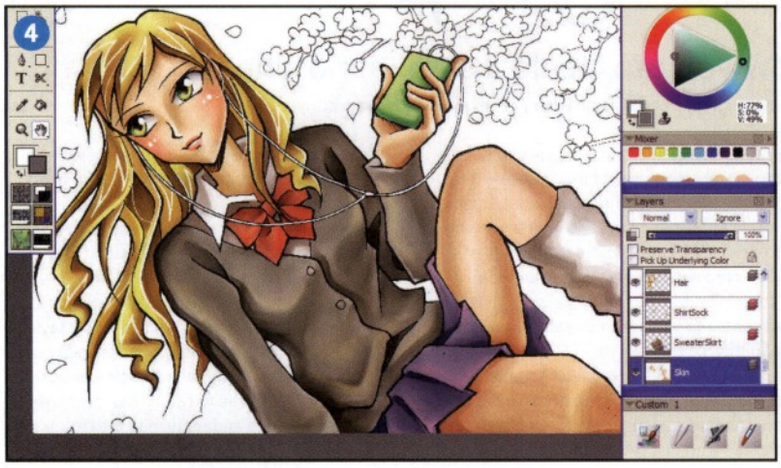
4 Gather your tools

Before beginning to paint I drag my choice of tools on to a custom palette, so that I'll always have them on the screen. For this project I choose Digital Watercolor > Broad Water Brush, Blenders > Grainy Water, Airbrushes > Digital Airbrush and Gouache > Opaque Smooth Brush 10.

5 Colouring

I begin by colouring the face using a digital watercolour. First, I cover everything with a light skin tone. I then introduce shadows with a medium skin tone, and create some depth with a very dark tone.

The Mixer palette in *Painter* enables you to paint swatches of a chosen colour so that you always have the right shade at hand. The shading can be rough and scribbly, as that's where the Blender tool comes in handy. Before using it, I have to dry the watercolour (Layers > Dry Digital Watercolor or Ctrl/Command+Shift+L). Then I take the Blender and smooth over what I've just drawn to create perfectly blended shadows.



6 Airbrushing

The rest of the image is coloured in using the same technique. The Airbrush can be used to create blush on the cheeks, add highlights to clothing or correct mistakes.

7 Gouache work

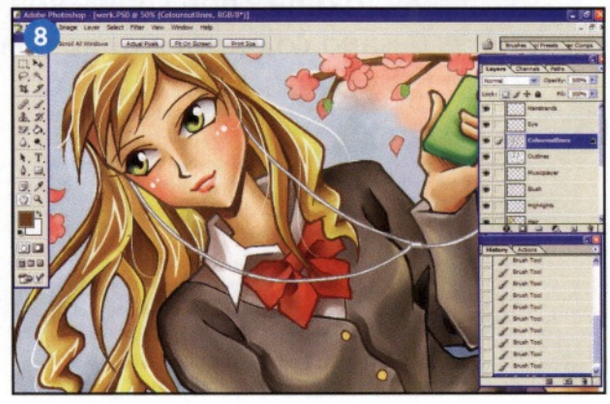
The Gouache brush is used for zig-zag hair highlights, which are another typical feature of manga illustration. I also like to add single, wispy strands of hair, in which case I work above the outline layer.

8 Final polish

When the colouring process is complete, I save the file and open it again in *Photoshop*. You can give the illustration a final polish by using the Hue/Saturation and Color Balance commands in Photoshop, colouring in the outlines (see Pro Secrets), or resizing and cropping. Once everything looks good, Flatten the image (or Merge Visible and discard hidden layers). ■

Coloured outlines

In *Photoshop*, go to the outline layer and change its blending mode from Multiply to Normal. Select all and copy, then create a new layer right above that layer and fill it with black. Turn this layer into a mask by clicking the Edit in Quick Mask Mode button in the toolbox, or by pressing Q on your keyboard. Paste the outlines to create a red-on-black mask. Remove the mask, and deselect the selection. The outlines are now on a transparent layer. Select Lock Transparent Pixels (or Preserve Transparency) and you can now colour freely over the lines.



[illustration] by Joanna Zhou [w] www.chocolatepixels.com

Dramatic manga painting

Expertise provided by Joanna Zhou. You can see more of her work at [w] www.chocolatepixels.com

The components needed to follow this tutorial can be found on the CD, in the Tutorial Files\Dramatic manga painting folder.

Joanna Zhou shows you how you can create a crisp, atmospheric and colourful manga painting without relying on outlines

One of the greatest challenges of painting is being able to produce realistic contours using colour and shade only. Manga style is poorly suited for this style of painting, since details are always rendered as inked outlines first.

We tend to think of 'colouring-in' a manga drawing, rather than 'painting' one, but this tutorial introduces an unusual manga technique that involves painting directly on top of the sketch. It's a great way to experiment with lighting, colour combinations and atmosphere, and I thoroughly recommend that you give it a try. Working without outlines also encourages you to loosen up your style, and trains you to exercise control within the fluidity of a painted surface. This is also an ideal 'crossover' technique for manga artists who want to venture into realistic fantasy painting, or vice-versa.

Bear in mind that manga characters are stylistically quite different from real humans, so standard painting conventions need to be treated with discretion. The distorted facial features mean that the T-zone across the eyes and down to the nose and mouth need to be treated with particular attention. A manga face is quite flat, so you can't make features meld with the bone structure as you would on a more photo-realistic face.

In this tutorial, the key is to keep your shading nice and subtle, and carefully layer on shadow until you have your desired result. Of course, this image is still quite comic-like, but you're free to tweak your own style between manga and realism to create something truly unique to you.

1 Stop the white wash

With the painterly technique in mind, I pay close attention to the interplay of light and shade when sketching. I try to visualise the final image without any outlines, and block in appropriate areas of shade. I scan the sketch, and set it to a Multiply layer in *Painter*. A good trick when attempting a dramatic or experimental piece is to fill the background in with a different colour; working off a white background will almost always force you into a rut of using predictable shades. I tested a few skin tones against the pale blue, and settled for complementary lilacs and dusty pinks – I would never have picked these tones if I had been working off white!

2 In the mix

Using the sketch as a guide, I begin blocking out areas of colour in my picture with the Smeary Round oil brush. As usual, I keep distinct areas on different layers for easy editing. For this technique it's very important to make use of the Mixer – this is a palette on which you paint tiny swatches of all the colours you've used in case you want them again (pick a colour up with the Eyedropper tool). The Mixer is also useful for controlling the overall colour scheme of your image. You can see at a glance how many shades have been used, and whether or not they complement each other.

3 Reduce opacity

My basic colouring style here is to block in shades with the oil brush, then smooth them with the Blender tool. The key objective is to wean myself off the reference sketch, so I constantly reduce opacity as the shading builds up. At one point I turn off the sketch altogether, and continue to work only with the colours on my painting layer. The Blender tool is amazing, but it should be used with care, as it can muddy up your shades if applied too liberally.

4 Sharp contrasts

As more details begin to emerge, I face the challenge of creating crisp edges without using outlines. The best way to simulate depth is to have a sharp contrast of dark (object behind) and light (object in front). You could even go a step further and really 'lift' an object by edging it with a colour that contrasts in hue and tone (such as the yellow hair highlight shown here). Try to build up all areas of the painting at an equal pace, with an equal level of complexity. This helps to ensure that your final piece will be coherent, and that all the colours and shapes work well with each other.

5 Cheek blush

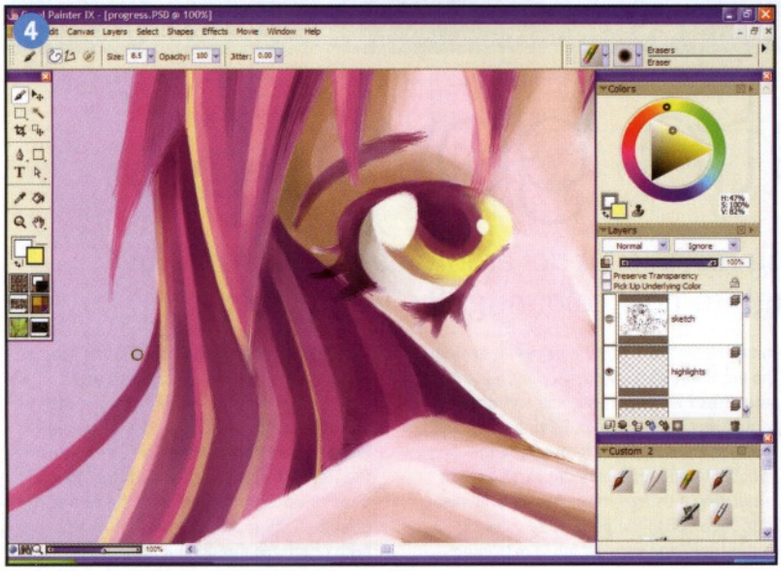
I create a new Multiply layer, and use the Digital Airbrush to paint on cheek blush. The Multiply setting means that any shading I've applied below will show through, and the tint will appear realistic. For the hair I use the Opaque Smooth Gouache brush to flick out pale, wispy strands – this has the effect of creating more depth in the picture. I decide to refrain from using solid black, because it would create much deeper shadows than those I want for the colour scheme of this image.

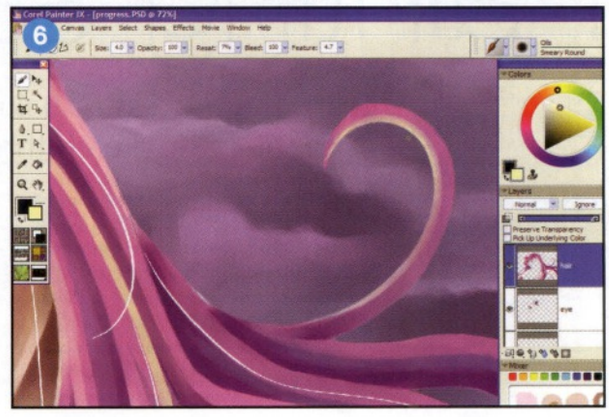
6 Strands of hair

The Blender tool is useful for defining strands of hair because (set to the right width) it creates a sharp edge with the adjacent colour. For the flyaway strands I colour over them thickly, turn on the sketch, and use the eraser to remove any excess. Finally, I paint in a dark cloudy sky to give the scene a little more drama, and add a sparkle trail with the Fairy Dust F-X brush; symbol brushes like this should be used sparingly, because they can quickly overwhelm a picture. ■

Dynamism and depth

Many tricks can be used to give very tranquil compositions a touch of movement, such as having flying strands of hair around an otherwise still character. Dynamism is closely linked with depth, because if you can show something moving through (or rather, suspended in) three-dimensional space it instantly generates a feeling of tension in your image. In this image the drop shadows below the hair strands, the mist in the foreground and the sparkle flying into the background all contribute towards this effect.





[illustration] Marta Dahlig [w] www.blckeri.com

Painting satin gowns

Expertise provided by Marta Dahlig. See more of his work at [w] www.blackeri.com

The components needed to follow this tutorial can be found on the CD, in the Tutorial Files\Painting satin gowns folder.

Learn the process of painting realistic fabric, embroidery and lace, from the basic sketch through to final colouring. By **Marta Dahlig**

Successful material painting is a real skill. The final effect depends on many elements, the most important of them being the kind of textile. Each material, such as velvet, linen, silk or taffeta, has its own distinctive qualities, and requires special techniques. Also, different lighting and folds can totally change the appearance of the material. On the following pages I'll explain the essential steps necessary to create a satin dress, such as designing and draping, as well as colouring, highlighting and shading. I'm also going to describe the specific texture of this textile, and ways of simulating it using various brushes. I'll also introduce you to the process of creating embroidery and lace, which is extremely useful for enhancing and decorating gowns.

To use the tutorial to its fullest you'll need professional painting software such as *Painter* or *Photoshop*, and a tablet. I've created the tutorial image in *Painter 7*, using the Tinting brush set imported from *Painter 6*, but it's possible to achieve the same effects in Photoshop. I'll be sharing tips for both programs throughout the process.

1 Create a character

It's easiest to design a dress on top of an character, so create a figure first, or open up a file with your character. Create a new layer on top of it and, after choosing a brush and a colour (preferably contrasting with the background), sketch the basic look of your gown. When designing the drapery, remember to vary the size and shape of the folds to make them more interesting.

2 Layer and light

Create a layer on top of the sketch, and mark the convexity of the folds (red lines). In draped dresses, the most convex areas are the tops of the folds and the edges of their curvature. Since the material has thickness and stiffness, the edges are thick as well, so mark this on your sketch too. Now choose a light source. It's easier to shade when the lighting point is between the side and the front of your character, as in this setting – the most convex areas are also the most highlighted. Create another layer on top of the convexity and sketch the highlights (light transparent shapes). Now, paint some shadows (violet shapes) – these are usually between and under the most convex areas. If you've chosen the light source to be at the side, remember that the opposite part has to be darker.

3 Defining shapes

It's now time to finalise the design of your drapery. Create a new layer under the sketch. Now, according to the convexity and lighting, push the sketch further, marking the general thickness of the folds and defining their shapes. Keep the light source in mind all the time, making appropriate parts of the dress respectively darker.

4 Brush choices

Now start applying colours. Create a new layer below the first sketch, but above the one from the previous step. Using both sketches and your colour palette as a reference, block out some basic colours for your gown. It's really important what tool you use; avoid airbrushes – they won't create a nice texture. Instead, choose something that has rough edges, like the Basic Round brush from the Tinting set in *Painter*, or a Hard Round in *Photoshop*. Use these at medium opacity (40–60%), to give the colours a chance to blend.

5 Blending colours

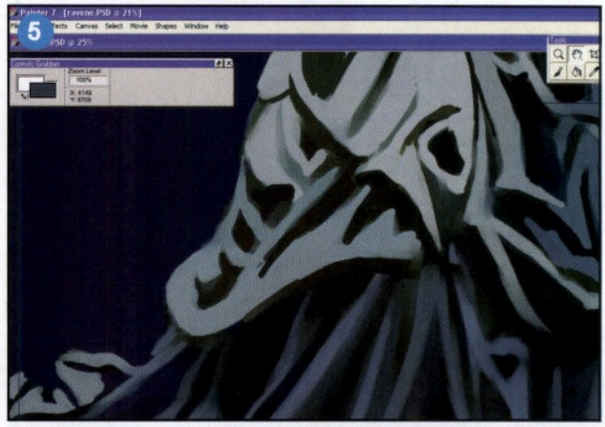
Now let's focus on the lower part of the dress. First, blend the difference between the heights and depths of the folds. If you're running *Painter*, use a Blender tool, and in *Photoshop* simply apply a low-opacity Hard Round brush on top of the contrasting areas repeatedly. Don't use the Smear/Smudge tools, as they will only blur away the texture we're trying to create. Remember to work on enriching the colour palette – shading with a hue different than your midtone (for example, shading a blue dress with violet or green) will dramatically improve the look of your gown. For this, use an opaque (5–10%) brush – your current tool or an airbrush. Remember that after applying colours of another hue you should blend them in immediately to make the hue transition look natural.

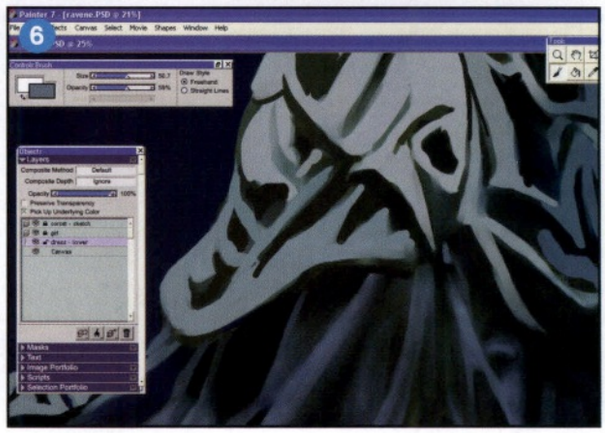
6 Soften the folds

Continue blending the folds until the transition between all the colours seems quite smooth. In addition to the Basic Round/Hard Round, you can also apply some opaque strokes with an Airbrush/Soft Brush. Photoshoppers can also blend with a Spackled Brush that's made out of many small dots. Since satin is not a stiff textile, most of the freefall folds won't be as straight as marked on the sketch. Break the 'belly' of each fold by darkening some areas or making discontinuous highlights. It's easier

Understanding textiles

If you're a beginner, start by painting a textile that's easy to recreate (such as a table-cloth), and experiment with different draping and lighting effects to understand the structure of the folds. If necessary, take some reference photos to learn from later, but bear in mind that drawing from nature is much more educational.





Shortcuts

Free Transform:
Ctrl/Command+T
The Free Transform bounding box enables you to rotate, distort and scale a selection in one go.

Colour sampling:
While using the Brush Tool Alt/Option+click on the canvas to sample the colour beneath your cursor and begin painting with it.

to add finishing retouches after having the full context, so let's move on...

7 Highlights and shadow

For the draped part of the dress, concentrate on making the difference between highlights and shadows more subtle. If the material is draped, you achieve this effect by lightening the dark areas and adding some shadows to the highlighted folds, instead of blending the transitions between light and dark.

8 Satin textures

Let's start working on the textures, to make the dress look like satin. You should keep in mind that in this textile colour transitions are smooth, but the transition zone must be very narrow. The highlights are thin but strong and have rather hard, well-defined edges, directly surrounded by darker areas. Keeping this in mind, add some subtle shadows around the convex areas, which make the edges of our highlights. Also, make the folds stronger by adding some shadows. I'd recommend the Basic Round brush for *Painter* users, and a Hard Round tool for Photoshoppers.

9 Change colours

Choose a colour of a different hue than your midtone, and add highlights based on the convexity and lighting sketch you made before. Bearing in mind the qualities of satin, add a highlight using a brush with well-defined edges (Smooth Ink Pen or Basic Round from *Painter*; Hard Round from *Photoshop*). Don't use pure white or pure gray for shading, as these tend to give an artificial look. If you make some shadows very dark, they give an impression of the fold being extremely curved.

10 Get blending

Remembering that the transitions should be thin but smooth, blend the colours with a Blender tool if you've got *Painter*, or a very opaque (5–15%) Hard Round in *Photoshop*. Continue detailing the many folds by giving them some additional highlights and shadows. Enrich the colour palette by breaking the existing colours with other hues. Also, avoid keeping too many layers at a time by merging them often.

11 And again...

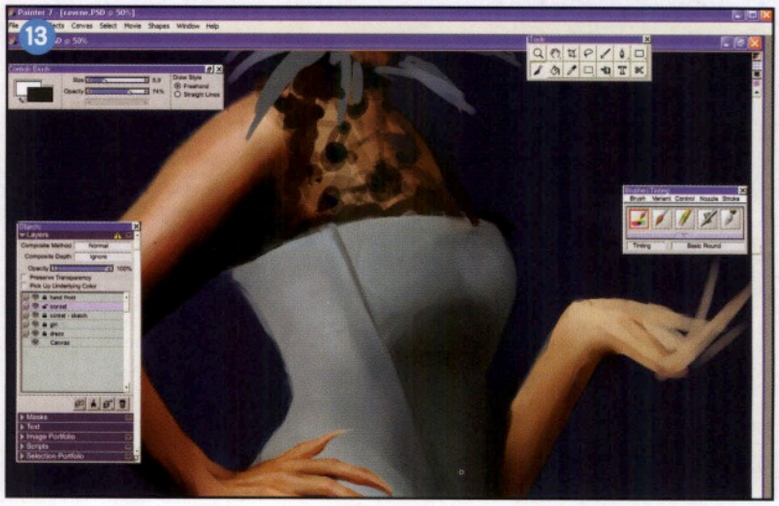
Continue blending colours in the same way until the transitions feel quite smooth. Try to differentiate the shadows. The shade which separates the convex and highlighted areas should be the lightest; the shadow on the folds which fade into darkness should be of medium intensity, and a hue similar to the background colour; and the shadow below the fold should be darkest.

12 Finish the folds

Create a separate layer for this, so that you can erase the changes any time you want. Keep blending until the colour transitions are smooth, working on highlights and shadows at the same time. Vary the apparent 'edges' formed by the curve of the material and its real border (central left). The former ones should have a smooth transition from shadows to highlights, while the latter should have a rough edge separating the dark from the light. The borders of textile are sewn to prevent ripping of the thread, so the edges of the material are thicker than the fabric itself. Therefore, make a thin highlighting stroke with an airbrush tool along those edges.

13 Time for the corset

Let's move our attention to the upper part of the dress. In a new layer, sketch the corset with a Basic Round (*Painter*), or a Hard Round (*Photoshop*). Apply subtle highlights and shadows according to the lighting sketch. Remembering about various types of shadows, make the corset fade into darkness, while making the breasts cast their own shadow as well.



14 A little lace

If you're dividing the corset into panels, remember that the panel edges should be highlighted, and cast a small shadow as well. Using the Basic Round/Hard Round brush, add shadows at both sides of the corset and enrich its colour palette. In *Photoshop* you can use the Dodge Tool, with a Hard Round brush and set to Highlights mode, to add sharp highlights to the material; remember to keep them subtle. Also, blend the colours with Blender/Spackled Round.

Once the corset looks right, create a new layer on top of it. Choose a small Fine Point brush in *Painter* or Hard Round brush in *Photoshop*, and sketch out your lace pattern. The design is up to you, but keep it logical, clean and detailed.

15 Embroidery

Now fill the design with a colour that you used for the outlines. Create a new layer, and design the embroidery on the corset in the same way as you did the lace.

16 Thread by thread

The lace looks too dark and bulky, so give it a slight transparency (90% opacity), and use your Eraser tool to make some holes of different sizes and shapes in the dark areas. As for embroidery, you should paint it in the same way that it's sewn: thread by thread. Select a 1-pixel Fine Point/Hard Round brush – you might have to zoom to around 400% to have a good view of what you're doing. Make dozens of short lines of similar length, placed next to each other, so that they form a kind of outline along the bigger shapes of your design.

17 A little trickery

Now duplicate the lace layer. Leave the original layer untouched, but change the opacity of the copied layer to around 10–20 % and move it a bit to one side. This nifty little trick will make your lace design appear fuller, while not affecting its subtlety. Continue painting the embroidery. With the same 1-pixel brush run all over the empty areas between the outline, making a tight zigzag pattern.

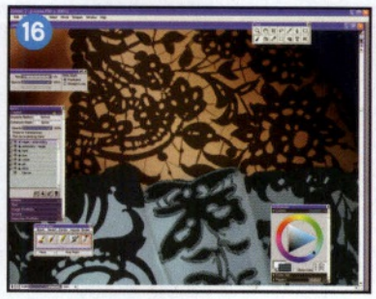
It's crucial that your lines be systematic: they should be somewhat parallel and placed next to each other, without any gaps. Their beginnings and ends can't overlap the outline you made before. They can also be slightly bent, to underline the thickness of the embroidery.

18 Zigzag pattern

Now select a lighter colour from the palette, and with the same brush apply more bits of thread, using the same zigzag pattern for the filling of the embroidery as for the outline. You can make the highlights a bit stronger at the edges that are more highlighted.

19 Bigger brush

To finish the embroidery, enlarge the brush to around 2 pixels, and change its opacity to 50%. Use a light colour on top of the most highlighted areas, especially the edges of the filling embroidery, and a dark shade on the opposite sides. Lace is often made out of designs set on a tiny net. Therefore, to finish off, create a new layer on top of the present one, choose a 1–1.5-pixel airbrush of the lace colour and run across the whole lace carefully, making first horizontal, then vertical lines.

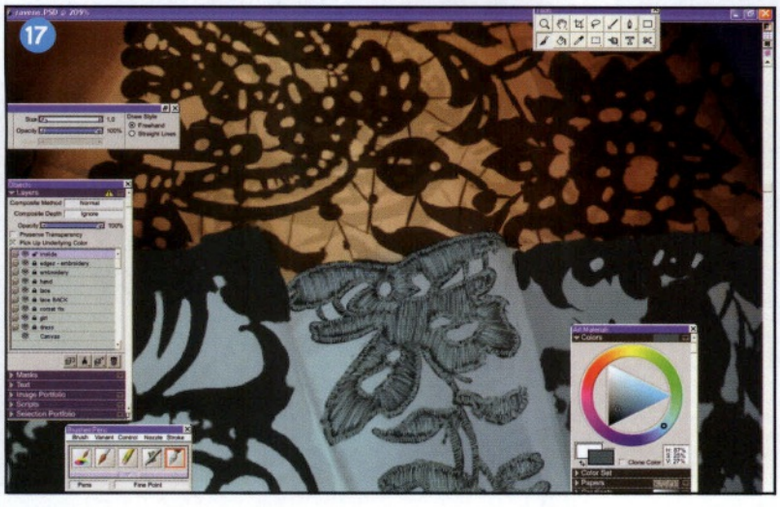


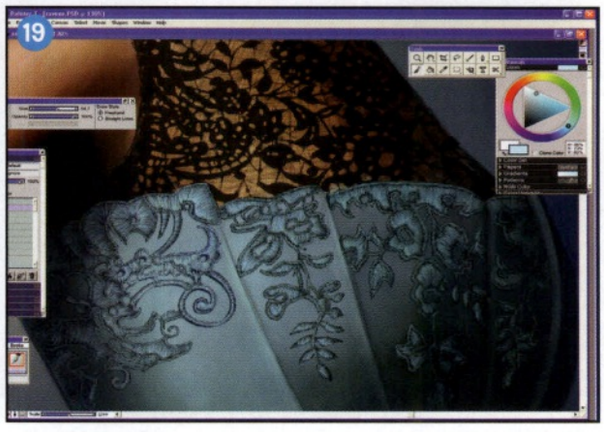
20 The final image

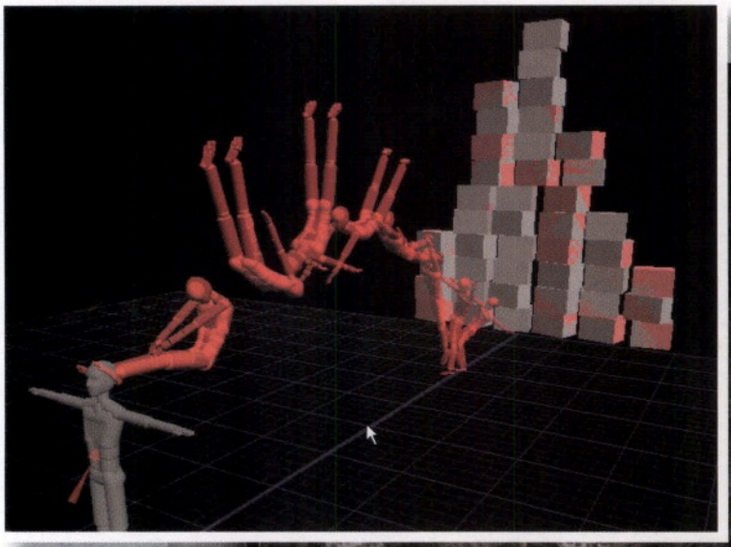
Now it's time to add some finishing touches. Add a suitable background to give your character some context, and, to enrich the dress design, add some elements which correspond with the dress itself (I've gone for a lace glove) as well as the background (the feather collar). You can see our finished image on the opening page of this tutorial, and you can check out the file on the CD to see it in more detail. ■

Shortcuts

Using shortcuts when you're painting will dramatically improve your workflow, especially if you switch between tools often. If you own a Wacom Intuos 3 tablet you'll have a collection of function keys on the sides of the tablet. These give you fast access to any function that you specify; with a single click you'll be able to choose a brush, undo your move or enter a specific menu.







4

The 3D universe

This chapter isn't just for artists who like to play around with 3D – it's for anyone who's serious about making a living in the fields of 3D rendering and animation. To that end we've got a feature on careers in 3D, and two more in which leading figures in the business talk about integrated production pipelines for movies and tie-in games, and about the prospects for creating truly realistic 3D humans. On the practical side we've got a whole host of fun tutorials – whether you want to have your movie characters pursued by boulders, create realistic lighting effects or batter the living daylights of a virtual stuntman, this chapter's for you!

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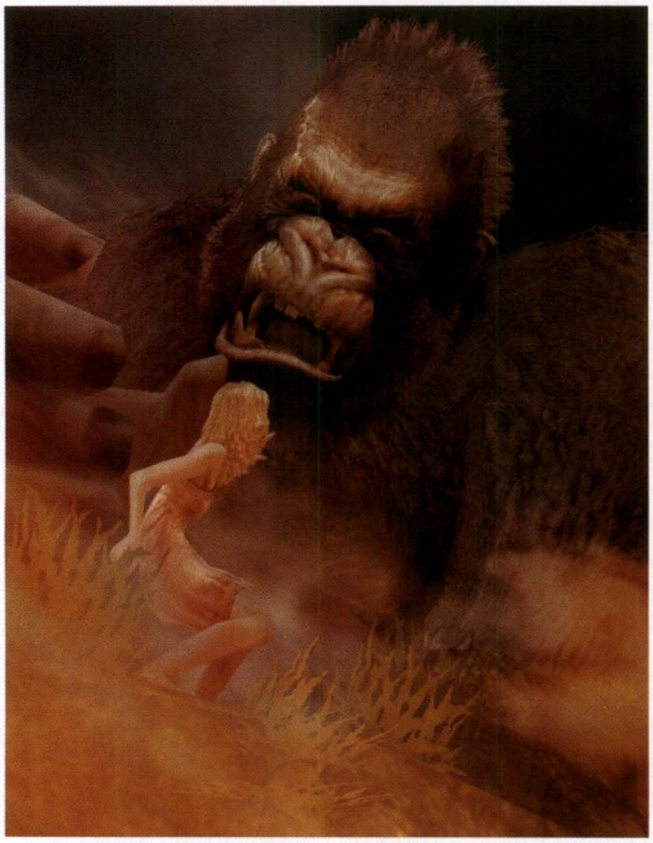


No self-respecting Hollywood movie would be complete these days without its tie-in game. The current crop includes Ubisoft's *King Kong* (above and below) and Disney Interactive's *The Chronicles of Narnia* (facing page). The increasing tendency of such titles to share digital assets with the VFX team is prompting developers to rethink production workflow.

Feature

Pipe dreams

As movie tie-ins become an increasingly common proposition within the games industry, much is being made of the potential for integrated production pipelines. **Jon Jordan & Barbara Robertson** investigate whether the re-use of film assets in games could be the way of the future for developers and technology firms

Since the turn of the century the marriage between Hollywood and the computer games industry has been sold as a match made in heaven. Film, with its megastars, its complex characterisation, and its laser-like focus on the visual spectacular, is the ideal companion for an interactive medium that can put its audience into the living, breathing, hyperactive world behind the silver screen. Want to be Spider-Man, James Bond, Neo or Nemo? No problem. Just switch on the PlayStation and let your movie experience continue.

At least that's the marketing spin employed in support of an ever-increasing range of film-to-game blockbusters, including titles such as *King Kong*, *The Chronicles of Narnia* and *Harry Potter and the Goblet of Fire*. But, veiled by this glibness, a dramatic shift is occurring on the production line.

Previously regarded as the junior partner, both in terms of business acumen and visual quality, games studios have raised their ambitions. As a result of new hardware such as Xbox 360 and PlayStation 3, developers have been revising their pipelines to take advantage of assets created by their movie partners – a process led by an influx of talent from the VFX industry. Publisher Electronic Arts has led the charge, recently announcing a three-game deal with Steven Spielberg.

The director will work with EA's LA studio, providing his expertise with respect to concept, design, story and artistic visualisation. But it's not just household names. Michael Talarico, EA's CG Supervisor for the *Harry Potter and the Goblet of Fire* game, carried out similar duties on the two *Tomb Raider* films, while ILM special effects veteran Habib Zargarpour is now EA Canada's Senior Art Director, working on its Bond series, amongst others.

The company is also capitalising on the kudos of existing movies with its remakes of classics such as *The Godfather* and *From Russia With Love*. "We're now seeing the likenesses of actors such as Pierce Brosnan and Sean Connery in games based on the Bond films," says Ian Shaw, Chief Technology Officer at Electronic Arts Europe. "Probably the best visuals I've seen are Marlon Brando in the next-generation

"Gamers are starting to embrace the sorts of techniques we've always used at ILM, especially when it comes to camera moves. Even introducing camera shake makes a huge difference."

Cliff Plumer, Chief Technology Officer, Industrial Light & Magic

Godfather game." Of course, before you can create film-quality visuals in a tie-in game, you need to be able to handle film-quality assets. "Technically, the current generation of consoles is still a step below using film models in terms of resolution, but next-gen consoles will change that," Shaw claims.

"There's also a commercial question. Both films and games can spend a million pounds on CG characters, but that money is spent with a different focus. The game budget often goes on creating interactivity, and optimising the characters for console hardware. But when we start spending many millions of pounds, I'm sure that this will generate the motivation to overcome these hurdles."

Pulling the strings

Key to this process are technologies once restricted to the movie effects toolbox, such as complex shaders, HDR lighting, multiple layers of textures, and million-plus-polygon models. These are beginning to filter down to real-time graphics, massively reducing the differences in the way that films and games are made. It's common for VFX studios to share assets with external game teams, but it's no longer just the usual mountains of concept material, miniatures and maquettes.

"Models, textures and shaders have been usefully converged for some time now, though a fair bit of work is required," says David Kirk, Chief Scientist at PlayStation 3 chip provider Nvidia. "Film assets that are appropriate for offline rendering can be simplified and recast for real-time rendering without losing the look and feel of the film.

Right: The first step to an integrated workflow is hiring VFX staff for games. Effects legend Habib Zargarpour now works on EA's series of *James Bond* titles

Despite studios' aspirations, console technology remains a limiting factor. While Harry Potter and the Goblet of Fire is being released simultaneously as both a film and a game (below), because the game is designed for current consoles such as PlayStation 2 it can't handle assets from its film partner. Only next-generation counterparts will permit such integration, says Ian Shaw of developer Electronic Arts

"Film models can now be used to trace normal maps for real-time use. But I don't think reusing shaders will be feasible, even on Xbox 360."

Magnus Högdahl, CTO, Starbreeze Studios

And it's obviously much easier to modify and simplify film assets than it is to start completely from scratch."

Magnus Högdahl, Chief Technology Officer at Swedish developer Starbreeze Studios, who worked on the game based on *The Chronicles of Riddick*, broadly agrees: "Film models can now be used to trace normal maps for real-time use, as our high-resolution models already consist of millions of triangles," he says. "Equally, basic diffuse textures and specular maps would be easy to use, since they can be scaled to the game's texture budget."

The problems, he explains, come with trying to reuse the more sophisticated material properties that really give a film its special look. "Because these are often encoded in textures, they're harder to use directly and would require us to use similar lighting models," he says. "As far as reusing shaders goes, I don't think it will be feasible, even on Xbox 360 or PlayStation 3. The best you could hope for would be to use offline rendering shaders as inspiration when trying to come up with a suitable cheat or approximation in real time."

Tyranny of now

It's this difference between real-time and offline graphics that remains the major point for debate. Dan Prochazka, Product Manager for Animation Software at Autodesk, contends that it remains a fundamental barrier. "While I think the two industries are now closer in many ways, the priorities for high-quality film shots are different to the priorities for high-quality games," he argues. "Visual effect shots count time per frame in minutes, while games developers count time in frames per second — that's 1,000 times faster than what's required for film."

He also points out that, for films, visual accuracy and quality are the highest priority. "If it takes another minute or two to render a frame, well, so be it. For games developers, however, the priority is to perform at a certain framerate."

One knock-on effect is the density of assets. "In visual effects, textures can be anything up to a gigabyte, while games developers are either limited to much smaller texture map sizes or, increasingly, are relying on real-time shaders," Prochazka says. In addition, film models are usually created using curved surfaces such as NURBS, while game artists remain committed to real-time-friendly polygons.

"There's an assumption that convergence between games and films will happen and that it's a good thing. I'm not sure either is true," Prochazka says. "Companies will place

The scale of the problem

Why convergence comes at a price: Ten challenges movie-quality assets present to existing videogame-development pipelines

1 Model sizes
While offline models can be scanned from maquettes at the equivalent of millions of polygons, the restriction of real-time processing means games models max out at just 50,000 polygons.

2 Lighting
High-quality techniques such as raytracing and subsurface scattering are so computationally intensive that the only way in which game artists can use them is to bake them into static textures.

3 Texture sizes
With offline rendering, image quality is all that matters. This means artists can create gigabytes of complex materials. For games artists, even textures consisting of tens of megabytes end up being compressed.

4 Offline shaders
Shaders for offline packages like *RenderMan* are very different from real-time shaders, which have to be written specifically for the hardware they will run on. While the technology is improving, it's still restrictive.

5 Animation rigs
Taking full advantage of the resolution available with offline rendering, film animation rigs are so complex that, as yet, there are no ways to reduce their inherent subtleties to real-time formats.

6 data types
Movie-quality NURBS-based models still don't work well within game engines, especially in terms of dealing with seams and automatic level of detail.

7 Volume of data
The sheer scale of assets handled by visual effects studios means they require some of the biggest computer clusters in the world to move all the data around.

8 Data density
With each second of movie effects weighing in at well over a gigabyte of assets, the volume of data also necessitates industrial-sized database and referencing systems, which is something that game studios have little experience of.

9 Toolsets
While 3D texturing applications such as *BodyPaint 3D* are beginning to find their way into the hands of games artists, high-end procedural animation packages, such as *Houdini Master*, remain conspicuous by their absence.

10 Production scale
With team sizes running in the hundreds, and budgets that typically exceed $50million, the scale of effects on even a run-of-the-mill Hollywood action flick outstrips even that of triple-A games, which typically have budgets of less than $20million.

Above: For all of their visual power, games still struggle to match film-quality imagery due to the sheer volume of data required. If you've seen *King Kong* you'll appreciate the difference between its CGI and this still from Ubisoft's tie-in game

the highest priority on making the offerings they deliver the best possible [for the market they work in]."

Others are more optimistic. Gareth Morgan, Softimage's Senior Product Manager, notes the problems but remains positive: "Real convergence is happening. Re-use is pretty much a done deal from a geometry and texture point of view. In 3D applications such as *XSI*, you can convert the high-frequency geometric detail found in film-resolution models into texture maps. These can then be used to simulate high-frequency details in conjunction with lower-resolution real-time models and the rendering acceleration found in game graphics hardware."

Although he agrees that there's a big difference between the way an artist sets up a multi-pass offline render and a 60 frames-per-second scene for a game, Morgan believes that there are further tangible benefits available in trying to unify these approaches.

One area of value in this respect is animation. "There's a long way to go before we can reuse character animation, especially articulated character rigs and their skins. But, equally, there are lots of good reasons for it to happen," he says. "The extensive use of digital characters is clearly a common area between visual effects and games, and with many franchises >

Where next for convergence?

MODELS AND TEXTURES

Ian Shaw
Chief Technology Officer, Electronic Arts Europe

"It's all about model resolution and shader quality. PlayStation 2-generation games are limited to 5,000 polygons with two texture passes. As we shift to next-gen consoles, we're finding polygon counts can go above 10,000. And, instead of texture passes, we're using 10 layers of real-time shaders. That's a huge step forward visually, and most of that benefit comes from shifting from texture maps to real-time shaders."

RENDERING TIMES

Magnus Högdahl
Chief Technology Officer, Starbreeze Studios

"In real-time graphics, we always have to make trade-offs between quality, quantity and frame rate. With offline rendering, you don't have to trade quality or quantity for speed, since you can just throw more computing power at the problem, or simply wait longer for the rendering. Eventually, content creation will be the only limiting factor for both real-time and offline graphics, but we're far away from that today."

GPUS AND SHADING

David Kirk
Chief Scientist, Nvidia

"As GPU programmable shading and geometry get more sophisticated and powerful, there is increasingly less difference in the performance and quality of the two media. Eventually, film assets will form the core assets for games. Fortunately, for companies such as Nvidia, this is a moving target. Although real-time rendering will inevitably be simpler than film rendering for quite some time, both will get better and better."

WORKING CULTURES

Dan Prochazka
Product Manager for Animation Software, Autodesk

"I don't see the next-generation platforms changing the usefulness of convergence between films and games. While they're more powerful, a fundamental difference in priorities will continue to prevent the sharing of assets. What makes a beautiful film will remain different enough from what makes a captivating game for their art assets not to be interchangeable."

Above: One final obstacle to pipeline convergence is timing. Although Starbreeze Studios received a scan of actor Vin Diesel's head, the CG assets for the movie version of *The Chronicles of Riddick* were not finished until the game was close to beta testing

publishing across both media, being able to reuse the digital character assets would be a significant benefit."

Scheduling difficulties

In fact, the biggest obstacles to film/game convergence may not be technical, but logistical. "To get proper synergies between projects, CG assets would need to be created well before filming has begun, while the game project would have to start at least a year before film production," says Starbreeze Studios' Högdahl. With *The Chronicles of Riddick* game, the film's finished CG assets weren't complete until the game was close to its beta testing phase.

Above: Typical of the problem game developers face when reusing movie assets, the image above shows a 400,000-polygon film-resolution model (left). Its game-ready companion on the right has just 2,000

> "There's a long way to go before we can reuse character animation, especially articulated character rigs and their skins. But, equally, there are lots of good reasons for it to happen."
>
> **Gareth Morgan, Senior Product Manager, Softimage**

"We did get a 3D reference scan of Vin Diesel's head, but all the modelling happened in-house." The result is that, by the time most films have been greenlit to go into production and the licensing negotiations are completed, games developers are already struggling to meet a 15-month deadline. It certainly doesn't give them much scope to also start wrestling with reworking half-finished movie visual effects assets. Despite the difficulties, however, Nvidia's David Kirk still thinks that joint development teams are the future – or one part of the future, at least. "It's possible to envision a joint team producing a game and a film together from the same assets, although I think one would have to lead, and the other follow," he says. "Forcing the two to progress at the same time and pace seems likely only to degrade the quality of one or the other."

So will true hybrid production pipelines, such as that linking LucasArts and ILM (see 'The Zeno production pipeline' on the facing page), really become the norm? Only time will tell. For now, the union between games and visual effects remains more a marriage of convenience than the 'happily ever after' scenario dreamed up by the PR agencies. But while the relationship may not always be easy, there are, it seems, no immediate grounds for divorce. ■

The Zeno production pipeline

Left: Artists at work on the Zeno pipeline system inside the new Letterman complex. Below: Just some of the technology needed to keep the pipeline operational

Industrial Light & Magic and LucasArts share more than a building Could this be a blueprint for future film/game convergence?

With each new generation of consoles, a new generation of pundits predicts that games will soon look as impressive as movies. But while graphics have improved hugely, photorealism is still only a promise; game cinematics are still not yet truly cinematic.

Even so, most action and sci-fi feature films are spawning matching games that sometimes use CG assets from the films. And games development companies are actively recruiting visual effects wizards. These artists are applying film techniques to games — and producing some dazzling visuals in the process. 'Cinematic', as gamers are now seeing, has as much to do with lights and camera work as with photorealistic rendering.

"Gamers are starting to embrace the sorts of techniques we've always used at ILM, especially when it comes to camera moves" says Cliff Plumer, Chief Technology Officer at Industrial Light & Magic. "Even introducing camera shake makes a huge difference. Things we take for granted in visual effects are changing video games."

He should know: this October, Lucasfilm's games division, LucasArts, and its visual effects division, Industrial Light & Magic, moved into the new, state-of-the-art Letterman Digital Arts Center in San Francisco. The relocation the two divisions together in one facility for the first time. Now, approximately 700 artists have access to the same tools on one hybrid pipeline, dubbed Zeno. Around 450 of the artists work for ILM; the rest work for LucasArts. The merger has influenced the development of new kinds of tools.

"The move allows us to work together and optimise both," says Jim Ward, Senior Vice President of Lucasfilm and President of LucasArts. "Once the next-generation games come out, people will be asking 'How did they do that?'"

ILM's R&D department first began developing a new visual effects pipeline in 1998-99, spurred by the need to manage large scenes to create the pod race in *Star Wars: Episode I*. When George Lucas decided to consolidate, and move the visual effects and games divisions of his empire to San Francisco, the studio decided to revamp ILM's pipeline in time for the move.

Thus, for the past two years, ILM's R&D department has been collaborating with LucasArts engineers. LucasArts' game engine, Zed, was folded into ILM's pipeline, Zeno. ILM replaced all its legacy tools with new Zeno modules, and created live links to commercial software. Both studios can access any module on the pipeline, and 3D artists can copy and paste between applications. "We can extract [ILM's] technology in Zeno and incorporate it into our runtime editor," says Ward. "And we're working with them to forge new ground."

The first focus for LucasArts has been layout, animation, nonlinear editing, and lighting. "The list will continue to grow as they work on their next titles," says Cliff Plumer. "Physics and particles will be added early next year."

The layout tools live within a new previsualisation module that evolved from LucasArts' game engine. Because the system is integrated within Zeno, it's tied into the whole production pipeline, including the asset-management system. "Artists have access to the database from the previz tool," says Plumer, "and it's drag and drop. They can drop whatever they need into a 3D scene."

At Zeno's core is a new, ILM-proprietary file format that allows Zeno to manage all the data on the pipeline. "Zeno is a fundamental toolset," Plumer says. "It's a timeline, scene graph and curve editor in one."

Maya, used for modelling, rigging and animation, is integrated into Zeno; the user interface is patterned after the Maya interface. Gamers can work on an asset in Maya, and publish it to Zed. If they edit it in the game engine, it automatically updates in Zeno.

Non-destructive override capabilities are built into the pipeline, making it possible for artists to work on individual pieces of a project without having to worry about the book-keeping; Zeno keeps track of parts, versions and relationships. A new lighting tool called Lux, which is render-agnostic, handles pass dependencies.

One of the last pieces to be finished was a new motion-capture stage, combining performance capture with real-time compositing. In addition to optical capture, the studio has developed image-based motion-capture tools. "LucasArts has already booked motion-capture shoots for the stage," says Plumer.

It's too early yet to see the effect of mixing games developers and VFX artists on one pipeline, but it's easy to imagine what might happen. Sharing assets is one likely possibility — a few *Star Wars* assets moved to LucasArts before Zeno. But Ward believes that the real opportunities lie elsewhere. "We think the opportunities will move away from 'here's a movie, let's make a game'," he says. "We have interactive games, but there's not a lot of depth to the stories. We're working on technology to bring more reality to the characters."

Right now, though, the biggest excitement for Lucasfilm is not the new technology, but the working culture it fosters. "There are so many common areas on the campus that we're starting to see the two artist cultures meeting each other," says Plumer. "There's a lot of conversation and communication between artist types who have worked for the same company for years, but have never met."

[illustrations] Loïc Zimmermann [w] www.e338.com

Feature

The fantastic five

Forget modelling or animation: the real heroes of 3D are the jobs most likely to land you a full-time position. Over the next few pages we profile five easily overlooked jobs that could provide your big break in the industry. By **Mark Ramshaw**

Runner

Jacks of all trades, runners do the little things that keep a studio working smoothly, making this a perfect job for new graduates

Andrew Proctor has worked as a runner at Soho studio The Mill for some six months. "What does a runner do?" he muses. "A runner does everything!" Good experience, then, for a recent computer animation graduate – a qualification that Proctor had initially hoped would enable him to walk straight into a prestigious job at a studio.

"That's just how everyone at university perceives it," he says. "But then you find out that's not how the industry works. All but the most exceptionally talented have to work up through the ranks."

Proctor is one of a dozen or so runners at the 200-strong company. Some have similar qualifications; others joined without taking a degree beforehand. Personal qualities often win out over academic ones; a runner, Proctor says, is there to keep the clients happy. "Our job is to make sure their day here goes perfectly, ensuring that they get first-class service and that we're the best at what we do. We make sure the suite is in order and get them food, drinks or anything else, no matter how obscure."

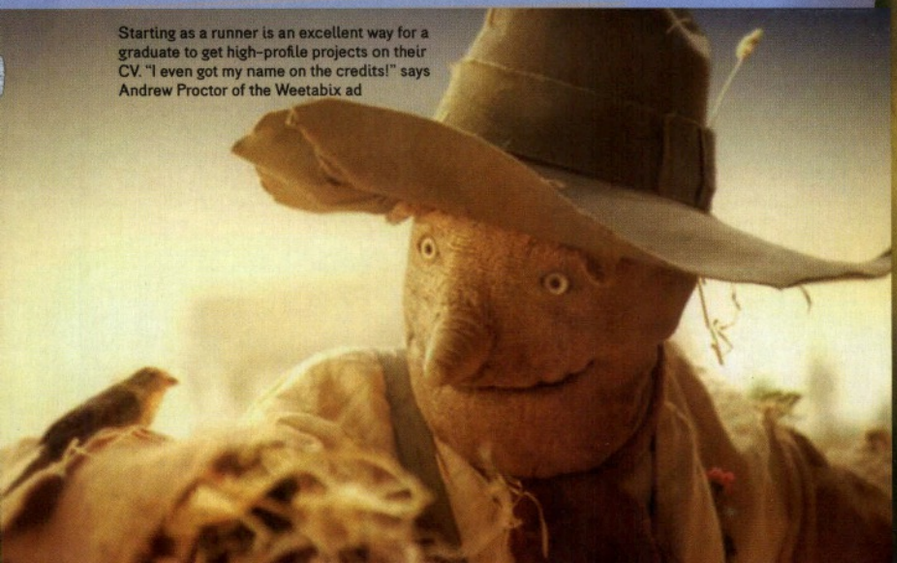
While making the tea may seem far removed from 3D computer graphics work, a runner has the benefit of access to pretty much any department within a studio, a luxury sometimes not available to other staff members. And with that comes the ability to gain training in any area they desire.

"There's no single career path," says Proctor. "You can end up working as a flame artist, an animator or even a producer. It just depends on what you want to learn. I worked with *Maya* for four years at university, but didn't really know how to use it at a professional level. Here I can get help from all the staff, get access to the computer systems in my spare time, and then start to get hands-on during work hours, helping out on different projects."

Although a runner is often thought of as a glorified teaboy, the job is more technical. "The first project I got to work on was a Weetabix commercial, doing tracking for four shots," says Andrew Proctor, a runner for The Mill

He says that a runner will typically work for between six months and a year before getting an interview to migrate to another department. Essentially, performing the job is like being in an informal recruitment and training programme. "The Mill is famous for the promotion rate of its runners. They're really keen for people to get training – it helps the recruits and it benefits the company."

Proctor admits that the hours can be tough. Overnight stints are necessary if the client needs staff on call, and all informal training is done in a runner's own spare time. However, he firmly believes that the payoff is worth it. "You get to learn how the system works and how the industry operates, and it gives you a real opportunity to progress," he says. "I'd definitely say that it's better to become a runner, rather than diving straight in at the deep end."



Starting as a runner is an excellent way for a graduate to get high-profile projects on their CV. "I even got my name on the credits!" says Andrew Proctor of the Weetabix ad

"PEOPLE DON'T NECESSARILY START OUT WANTING TO WORK AS A RUNNER, BUT IT'S AN ACCEPTED WAY OF GETTING ON IN THE INDUSTRY"
ANDREW PROCTOR, RUNNER, THE MILL

FACT FILE

Job title
RUNNER
Key responsibilities
Attending to clients, doing odd jobs, helping out across the company
Key qualifications
Computer animation degree preferable but not essential (depends on final career path)
Jobs available
300–400
Starting salary
£10,000
Job prospects
Runners typically move on to other jobs within six months to a year
Ease of transfer
Often leads to work within another division of a studio, such as animation or compositing
Pros
Opportunity to get a foot in the door of a studio; on-site access to professional-level software and hardware
Cons
Long hours; graduates may find work very basic

Pre-viz artist

Although little documented, this increasingly popular role provides a springboard into supervising or directorial work

FACT FILE

Job title
PRE-VIZ ARTIST
Key responsibilities
Development and visualisation of shot design, set-up, timing and editing
Key qualifications
Cinematography/ animation experience
Jobs available
100–150
Starting salary
£15,000–£20,000
Job prospects
Currently limited, but the tiny pre-viz sector looks set to expand in future
Ease of transfer
Possibility to progress to VFX Supervisor, or even directorial work
Pros
Introduction to whole film-making process; valuable networking; involvement in creative development of projects
Cons
Lack of control over projects; working on individual projects for extended periods

Pre-viz, warns Pixel Liberation Front Lead Artist Christopher Batty, is not currently one of the larger employment sectors in the CG industry. Despite being the best-known dedicated pre-visualisation studio in the world, Pixel Liberation Front still employs just nine people full time, with freelancers hired as the need arises.

"There aren't many other companies like us yet," says Batty, "and pre-viz is a bit of a hit-and-miss area for larger studios, where they can't always rely on enough work in-house to keep a team busy. But there are some, like ILM, who now run their own departments."

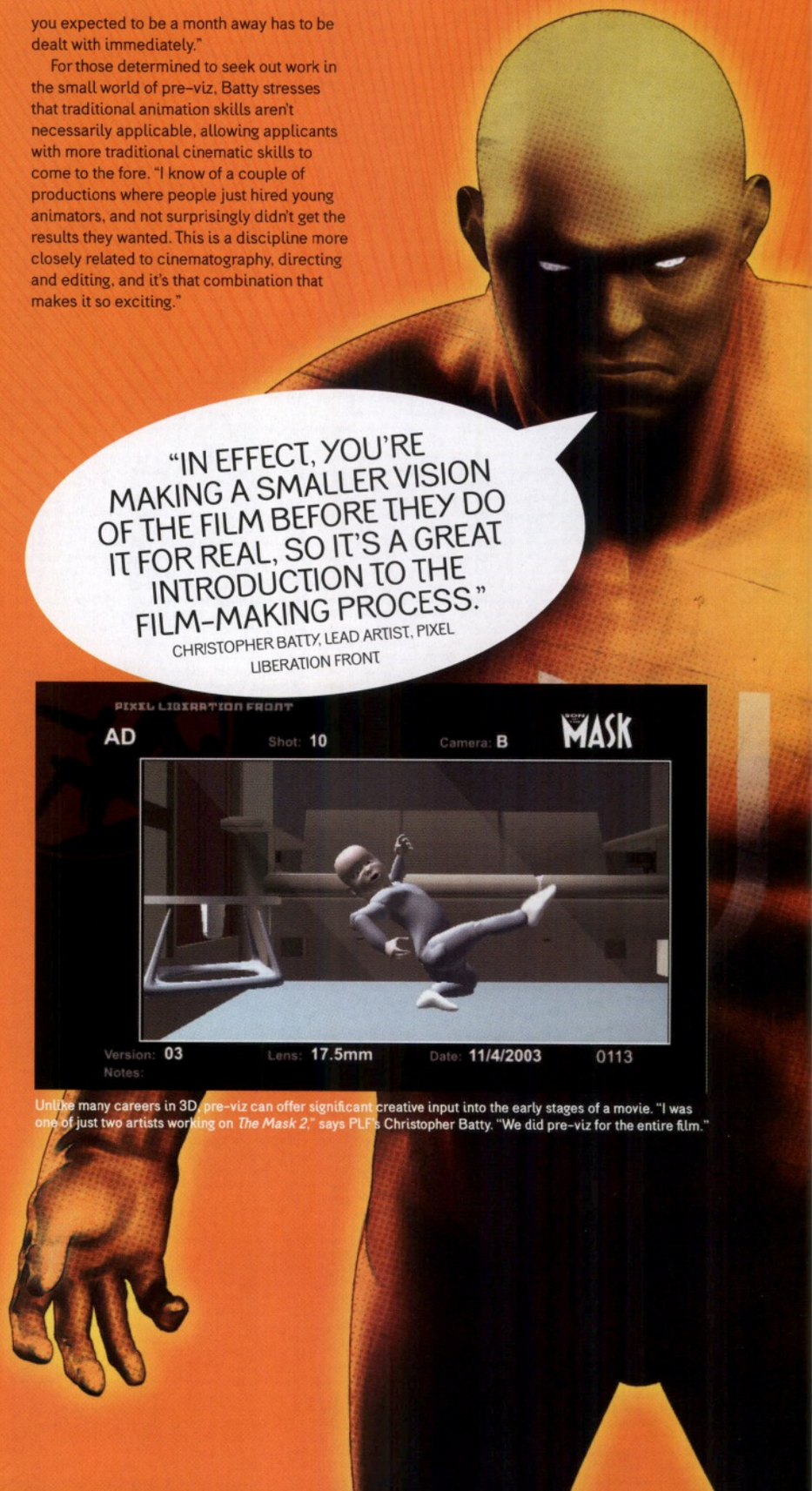
Batty joined PLF in 2001, after a brief time spent working in New York in the architectural visualisation and broadcast fields. "A lot of the core people here came from an architectural and graphic design background, although as the company has grown, others have joined with backgrounds in traditional and computer animation, and even some with a background in sculpture or teaching," he says.

One of the key attractions of pre-viz is the ability to get to the heart of the movie development process, working closely with the heads of each department to map out how the movie will be put together. "With several films, we've started work on them before they even had a completed script," says Batty.

Although pre-viz artists work with 3D packages, the work is far removed from other kinds of 3D animation. "A lot of the time we're working at a fairly crude, video game level of rendering," explains Batty. "It's more about figuring out how the shot is going to work, and working on the timing and editing. The idea is to give the director something that reflects his vision, that he can use as a communication tool, whether that's to get a project greenlit or for working with the camera department, the art department and the vendors handling the effects."

Although pre-viz artists are often required to work on a project from pre-production right up until near the end, Batty says that the hours are fairly regular, with less pressure than is placed on the effects facilities. "Each production has its own challenges, though," he reveals. "If a director is under pressure, that can trickle down, or schedules can change and a shot you expected to be a month away has to be dealt with immediately."

For those determined to seek out work in the small world of pre-viz, Batty stresses that traditional animation skills aren't necessarily applicable, allowing applicants with more traditional cinematic skills to come to the fore. "I know of a couple of productions where people just hired young animators, and not surprisingly didn't get the results they wanted. This is a discipline more closely related to cinematography, directing and editing, and it's that combination that makes it so exciting."


"IN EFFECT, YOU'RE MAKING A SMALLER VISION OF THE FILM BEFORE THEY DO IT FOR REAL, SO IT'S A GREAT INTRODUCTION TO THE FILM-MAKING PROCESS."
CHRISTOPHER BATTY, LEAD ARTIST, PIXEL LIBERATION FRONT
PIXEL LIBERATION FRONT
AD
Shot: 10
Camera: B
MASK
Version: 03
Lens: 17.5mm
Date: 11/4/2003
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Unlike many careers in 3D, pre-viz can offer significant creative input into the early stages of a movie. "I was one of just two artists working on *The Mask 2*," says PLF's Christopher Batty. "We did pre-viz for the entire film."

Research & development

Adding brains to beauty, it's the developers in the R&D department who come to the rescue when studios need complex effects and the work commands correspondingly high salaries

While there are many fine examples of high-quality CG work created solely with off-the-shelf software, the leading effects facilities and animation studios invariably provide their artistic staff with custom-written tools, and for these proprietary solutions, they rely on the scientific expertise of R&D.

Over at Digital Domain, Doug Roble is Creative Director of Software in the studio's development division. "I get to code and manage projects, rather than people," he explains. "Specifically, I'm in charge of fluid system development and computer vision, working with Nafees Bin Zafar and John Flynn respectively. Computer vision involves trying to figure out where things are, how light bounces around and so on. We've got a cool set of tools, including *TRACK*, which won an Academy Technical Achievement Award in 1999."

There are two distinct areas that are handled by development programmers – tools for artists and tools to help the facility run as smoothly as possible. In effect, the clients are the studio's artists. "That means the user base works right alongside you, providing feedback when things work well and when they don't," says Roble. "It's a high-pressure job, but one that offers almost immediate gratification. Artists will often tell you they couldn't have created a shot without your software."

Roble explains that a Bachelor's or Master's degree in computer science, engineering or mathematics is a typical requirement for a software developer. Roble himself gained a PhD in Computer Science from Ohio State University in 1992. Studios like Digital Domain tend to recruit people straight from college, although there is some migration between R&D and technical direction. Roble says that the latter is less common, although he notes that TDs who do move into development tend to possess a valuable artistic bent. "We've also had a couple of developers join from the video games industry," he adds. "They bring a real desire for efficiency, which is sometimes lacking with some of the more high-falutin' software developers."

Roble points out that this is something of a niche area. After all, a development team is a financial burden, and so it requires a studio of a certain size to support it. "Smaller places may have one or two technical directors who know how to code, but often they'll be focusing on shots rather than long-term solutions," he explains.

Software development is also becoming more pressured due to shrinking movie schedules. "We have long-term projects, such as volume rendering tools, which span several movies, but there are also times when a movie drives the technology. With schedules shrinking from two years to 18 months or less, we have to be smarter than ever to anticipate what's required or to control the scale of the challenge. But then we are further removed from the frontline than most. The animators have much crazier hours!"

FACT FILE

Job title
R&D/SOFTWARE DEVELOPER

Key responsibilities
R&D of custom systems and graphics software

Key qualifications
Bachelor's degree or higher in computer science, mathematics or engineering

Jobs available
100–150

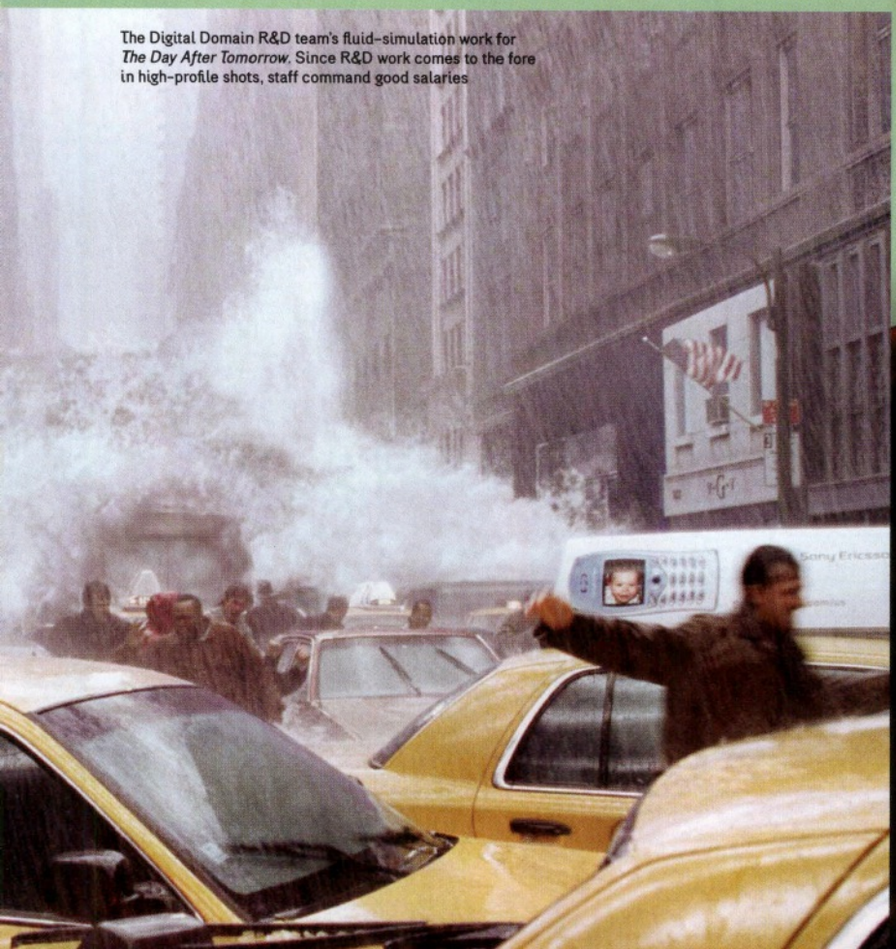
Starting salary
£30,000

Job prospects
Science-based job skills are applicable to few other roles

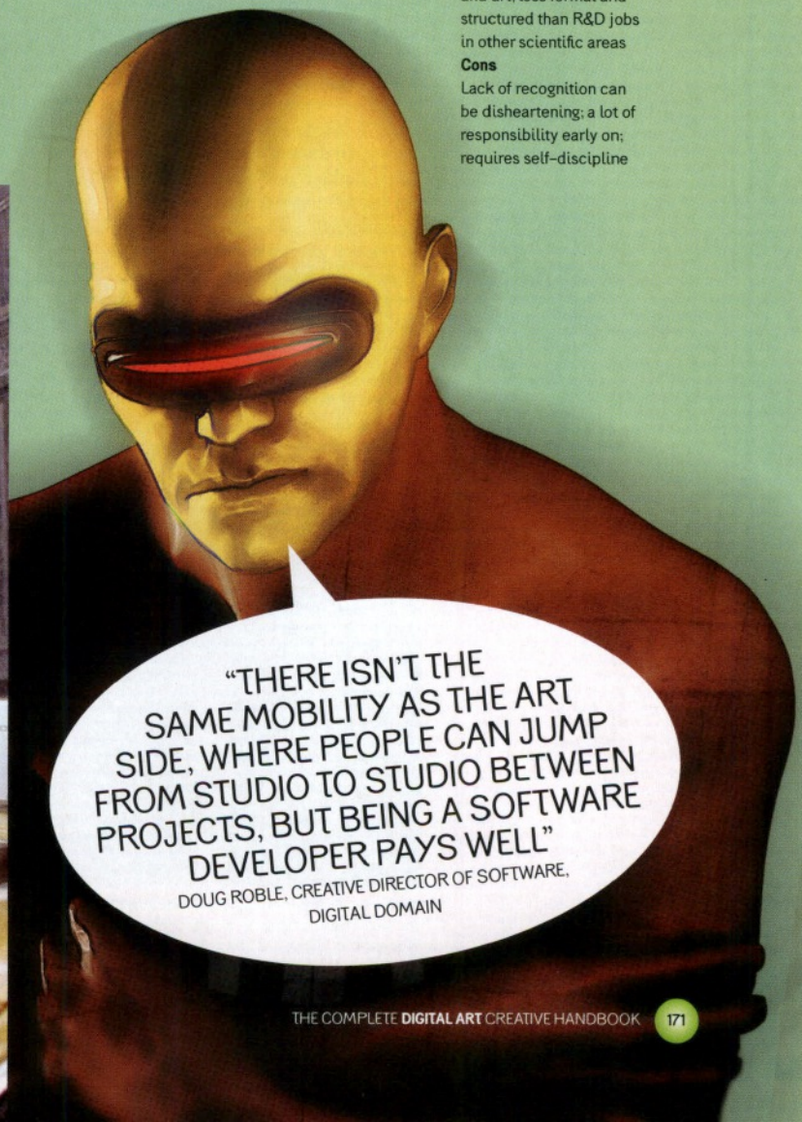
Ease of transfer
Opportunity to move into technical direction

Pros
Wide range of challenges; unique combination of maths, computer science and art; less formal and structured than R&D jobs in other scientific areas

Cons
Lack of recognition can be disheartening; a lot of responsibility early on; requires self-discipline



The Digital Domain R&D team's fluid-simulation work for *The Day After Tomorrow*. Since R&D work comes to the fore in high-profile shots, staff command good salaries


"THERE ISN'T THE SAME MOBILITY AS THE ART SIDE, WHERE PEOPLE CAN JUMP FROM STUDIO TO STUDIO BETWEEN PROJECTS, BUT BEING A SOFTWARE DEVELOPER PAYS WELL"
DOUG ROBLE, CREATIVE DIRECTOR OF SOFTWARE, DIGITAL DOMAIN

Technical director

FACT FILE

Job title
TECHNICAL DIRECTOR

Key responsibilities
R&D work within 3D applications, plus technical animation for shots

Key qualifications
Degree in computer animation, computer science or engineering

Jobs available
300–400

Starting salary
£20,000

Job prospects
Progression to lead technical director and sometimes CG supervisor

Ease of transfer
There are opportunities to move into either R&D or animation

Pros
A truly unique combination of scientific and creative work

Cons
Long project duration with the potential for much repetition, plus a lot of pressure and responsibility

In an industry that combines scientific innovation with creative virtuosity, the technical directors are the all-important link

Programmers toiling away in the research and development departments fall neatly into their own scientific camp, while the majority of other jobs in the industry are generally more closely linked to the creative side of the production pipeline. However, the role of the technical director is a little less easy to pigeonhole.

"A technical director acts as a bridge between the scientific and the artistic," explains Chris Lawrence at Framestore CFC. "Within the area of technical direction there's then a fair degree of variation, with some people more inclined towards the R&D work, and others more towards the artistic side of things, dealing with elements such as lighting."

Lawrence joined the studio four years ago, after graduating from university with a degree in Engineering and Computer Science. While on that course he took an internship with Hewlett-Packard that further sparked his interest in the creative side of the industry. "Working with them out in Palo Alto, I got to see a lot of interesting work using image-based modelling, high-spec digital cameras and lots of blue sky stuff," he says. "A few other technical directors here have a similar engineering background, and some studied computer science, although the majority went through the usual Bournemouth [University] animation route."

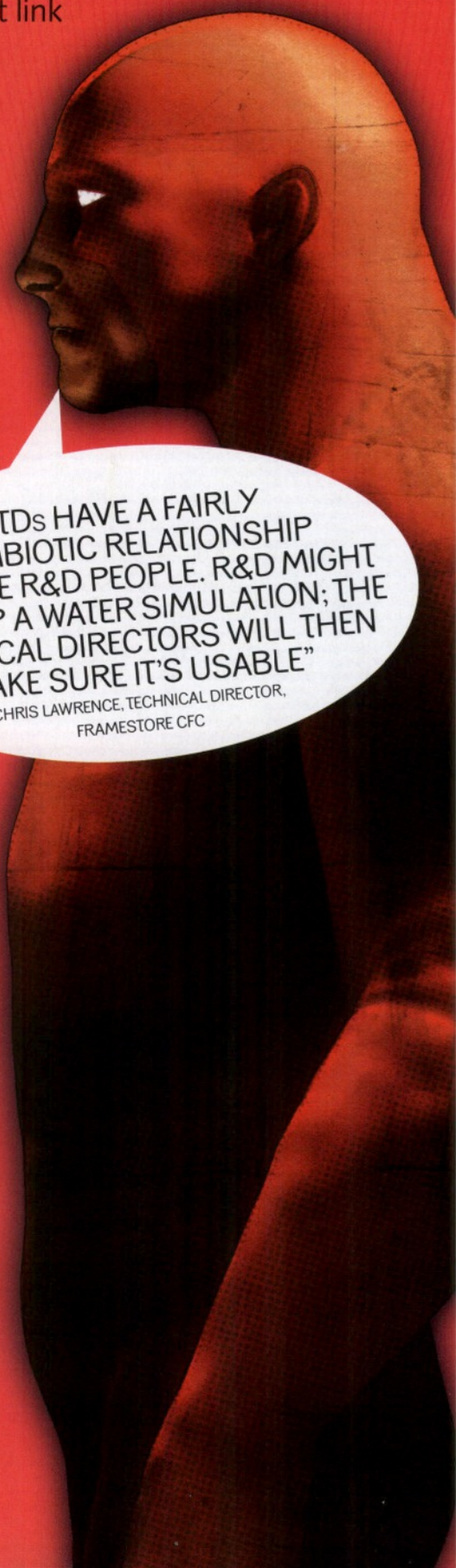
His first job at the studio was in the systems department, where he spent a year taking time to learn *Maya* better, before switching to technical direction. A more common path, he says, is for people to start out as render wranglers or motion trackers. Technical directors can eventually go on to become CG supervisors, although with salaries ranging from £20,000 to somewhere around £80,000, there's obviously a lot of room in which to manoeuvre within the TD department itself.

Lawrence explains that a technical director's role keeps them working throughout the production schedule: "When the company takes a project on, there's a period of R&D where the TDs will concentrate on look development, while simultaneously working to overcome any technical hurdles, and providing the artists with a system that's intuitive enough for them to do their work efficiently."

Whereas R&D programmers usually code using a programming language such as C++, technical directors will typically write the plug-ins and scripts for applications. And while an R&D department remains focused on software development and problem solving, the role of the technical director shifts once live plates start to be handed out to an effects facility.

"Then our work involves making the shots look as good as possible," says Lawrence. "We deal with pretty much anything that's not handled by the animation teams, such as particles, setting up dynamics, creating secondary or tertiary animation systems, and working on lighting."

Although technical directors are plugged into a project from start to finish, Lawrence says they tend to work regular hours. "There's always some crunch time, but I haven't had to work that much overtime in the last couple of years. We're more exposed to schedules than animators, but certainly less than the compositing department."



"TDs HAVE A FAIRLY SYMBIOTIC RELATIONSHIP WITH THE R&D PEOPLE. R&D MIGHT DEVELOP A WATER SIMULATION; THE TECHNICAL DIRECTORS WILL THEN MAKE SURE IT'S USABLE"
CHRIS LAWRENCE, TECHNICAL DIRECTOR, FRAMESTORE CFC

Technical directors bridge the worlds of art and science. "On *Troy*, I was involved with the rendering set-up for this armada sequence, working out how to manage its complexity within *Maya* and *RenderMan*," says Framestore CFC's Chris Lawrence

Matchmove artist

As digital effects, characters and set extensions become ever more complex, the job of the matchmover, who meshes them into live footage, is becoming more highly prized

Live action doesn't combine with CG all by itself, you know. It's the problem-solving skills and unflinching eye for detail that are provided by the matchmove artists that ultimately enables animators, lighters and compositors to fuse the two disparate elements together.

Lisa Gonzalez is a matchmove artist at the Moving Picture Company, having joined after gaining a Bachelor's degree in Computer Animation and Visualisation at the UK's prestigious Bournemouth University. "The key responsibilities of a matchmove artist at MPC involve reproducing live-action camera moves within a 3D environment using a 3D camera solve, constructing 3D scene geometry, and 3D rotoscoping of characters and objects to match the live action," she explains. "We liaise and supply matchmove elements to all areas of the VFX pipeline, from lighting and animation to 2D roto and compositing."

There are currently 20 artists in MPC's matchmove division, with the matchmove co-ordinator moving team members from one project in the film department to another as the need arises, rather than assigning them for the duration of one show. In addition to standard tools such as *boujou*, *3D-Equalizer*, *Maya Live* and *Shake*, Gonzalez also works with MPC's own proprietary matchmoving tools.

"A relevant degree in 3D graphics, photography or a similar art-based or computer subject helps to prepare you for the job," she says, "but there is still a need for a training period when you start, because in general, previous employment and education don't train you specifically for matchmoving."

Matchmove artists generally work on a freelance basis, with starting salaries ranging from £14,000 upwards, depending on experience and ability. Many graduates, as well as the studios, consider matchmoving to be an entry-level position. MPC instead emphasises matchmoving as a career in itself, stressing the need for more experienced matchmovers as standards rise, and the job becomes ever more complex.

"Matchmoving is a highly skilled and demanding area of 3D, providing an essential service for the rest of the 3D team, and it should be regarded as such," says Gonzalez. She also points out that matchmoving is not necessarily the first stepping stone for graduates. "People have joined our department from other areas of post-production, such as 2D rotoscoping, motion capture, animation and lighting."

With regard to working hours, matchmove artists tend to work a typical week, although there are the inevitable crunch periods. "Crunch times for matchmovers tend to be earlier in the duration of a show's production, because we're the first stage in the 3D pipeline. However, we're also on-call at the end of the show to deal with the last-minute matchmove requirements that tend to arise," says Gonzalez.

Of all the roles covered in this feature, matchmove artists are perhaps the ultimate unsung heroes. Few outside of the industry ever really understand what they bring to a show, or even that there's a need for matchmoving at all. And even those in the know are prone to forget about their contribution. As Gonzalez says: "Our work is an unseen art." ■

FACT FILE

Job title
MATCHMOVE ARTIST

Key responsibilities
Working to align 3D movement of a live scene with all CG elements, such as characters and set extensions

Key qualifications
Bachelor's or higher in computer science or a similar artistic degree

Jobs available
400–500

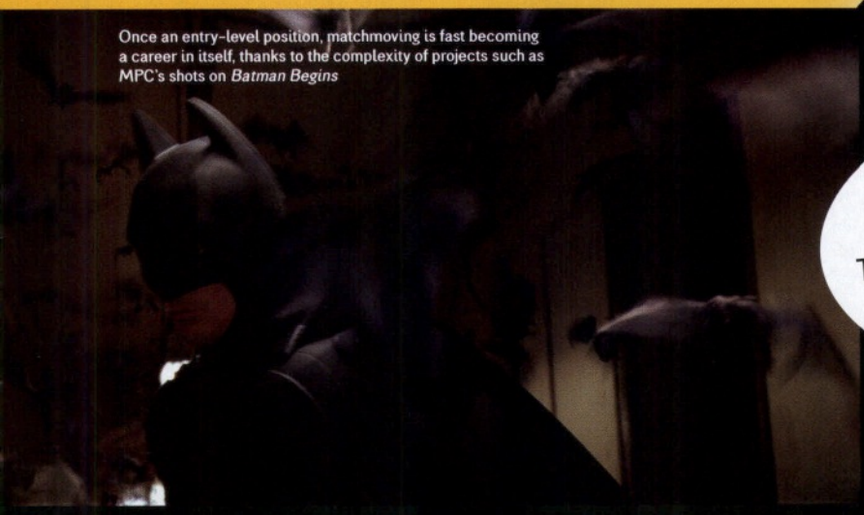
Starting salary
£14,000

Job prospects
Matchmove departments can be large, offering opportunity for progress

Ease of transfer
Matchmoving is often used as a stepping stone to other jobs

Pros
Work on various projects, enables you to gain a good understanding of the entire pipeline; chance to get on-set

Cons
Software limitations cause problems; stigma still attached to the role



Once an entry-level position, matchmoving is fast becoming a career in itself, thanks to the complexity of projects such as MPC's shots on *Batman Begins*

"MATCHMOVE ARTISTS PROVIDE THE UNIQUE SKILLS THAT ALLOW THE REST OF THE 3D PIPELINE TO DO THEIR JOBS SO COMPETENTLY"

LISA GONZALEZ, MATCHMOVE ARTIST, MOVING PICTURE COMPANY

[illustration] Olivier Ponsonnet [w] http://re1v.free.fr

Feature

Human 2.0

What will virtual characters look like by 2010? Over the next six pages, we review two decades of digital evolution, and ask key researchers to predict their future. By **Kira-Anne Pelican**

Twenty years ago, on *Young Sherlock Holmes*, a knight leapt from a stained glass window and a new age in movie special effects dawned. We knew immediately that we could expect great things to follow the appearance of this first fully 3D digital human, and the first steps were taken on the rapid learning curve towards photorealism. Industrial Light & Magic's morphing 'pseudopod' followed, in *The Abyss* (1989). Using cyberscans of Mary Elizabeth Mastrantonio, the water creature took a first stab at digitally cloning a real-world human when it mimicked her facial expressions. With rapid developments in technology, and ever-increasing processor speeds, the next decade saw a flurry of virtual characters. 1990 marked the first recorded attempt to use motion capture in a feature film, for *Total Recall*; the attempt failed, but two years later, for *Lawnmower Man*, early motion capture systems, though limited in speed and resolution, gathered basic body motion. In 1991, the quicksilver T-1000 strode on to our screens in *Terminator 2: Judgement Day*. Using new morphing techniques developed at ILM, the T-1000 was able to morph into any person or object. A couple of years later we saw the first digital doubles in *Jurassic Park* (1993), but they were

Realistic eyes are a major current area of research. For *The Polar Express*, Sony Pictures Imageworks even modelled different lenses that could be dialled in

> "Mocap is only the capture of movements. What needs to be captured is performance"
>
> **Ed Hooks, Author of *Acting for Animators***

Another solution is to use real-world data. EA's *Fight Night Round 3* demo combines digital cloning techniques with real-time rendering

only briefly on-screen before being devoured by Oscar-winning Dennis Muren's dinosaurs. These were the first examples of CG characters with skin, muscles and texture. By the middle of the decade, game characters, previously the visual effects industry's poor relations, were also making great leaps forward. Rapid developments in graphics hardware rendered *Quake's* hundreds-of-poly characters impressive in comparison with historical 2D sprites. In 1996, Lara Croft, one of 3D gaming's first true personalities, bounded across our screens, while over in Japan, Square popularised fully rendered game characters and near-film-quality full motion video in *Final Fantasy VII*.

Back in Hollywood, as the industries were converging, the next great leap forward was through the population of the *Titanic* (1997) by thousands of digital extras, all animated with motion capture data. The following year, PDI broke new ground with the development of crowd management systems and muscle-based facial tools on its entirely CG feature, *Antz*. ILM was, meanwhile, developing its motion capture technology, which when combined with procedural and keyframed animation, produced the grotesque decaying flesh, sinew and organs of *The Mummy's* Imhotep. The century wrapped with the brash spectacle that was *Star Wars: Episode I – The Phantom Menace* featuring lead CG characters such as Jar Jar Binks, and thousands of digital extras.

Final Fantasy: The Spirits Within (2001) achieved a level of stylised realism in its human characters not seen before. Synthetic human actors were, for the first time, given roles that could easily have been played by real humans. Motion capture was used to animate the key characters' bodies, while facial and hand animation was keyframed. One of the most ambitious films of its time, it nonetheless failed to win over its audience. Ed Hooks, author of *Acting for Animators*, says: "Mocap is the capture of movements. What needs to be captured is performance." That wasn't going to happen until we saw Gollum, arguably the first CG character with spirit, in *The Lord of The Rings* trilogy.

Facial cloning

A big breakthrough in skin shader technology came with the development of subsurface scattering (SSS), as seen in *The Lord of the Rings: The Two Towers* (2002). Until then, human skin had tended to look harsh and opaque. Subsurface scattering is a method of simulating skin translucency through the emulation of the scattering of light particles that penetrate the skin. Used to spectacular effect with Gollum, the technology won an Academy Award for Technical Achievement. Gollum's creators at Weta weren't alone in recognising the potential of the technique, and SSS has since been used as a staple on countless films.

The team at Sony Pictures Imageworks took a different route on *Spider-Man 2* (2004) when creating the photorealistic digital double of Doc Ock. Rather than using subsurface scattering techniques, they used the Light Stage system developed by Paul Debevec at the University of Southern Calfornia's Institute of Creative Technology. Through high-resolution photography, the reflectance field of Alfred Molina's face was captured and, using the resulting images, Doc Ock's face was reconstructed from any given angle, and under any lighting condition, to Academy Award-winning effect.

For *The Matrix Revolutions* (2003), George Borshukov's team at ESC Entertainment faced the challenge of creating a 'superpunch' – the final punch that Neo delivers to Agent Smith – deforming his face in a startling, exaggerated fashion, and captured by a close-up camera move. Borshukov's team created the shot entirely in 3D using the Universal Capture marker-free motion capture technology it had been perfecting over the previous three years. Because the film's audience would be well acquainted with Hugo Weaving's face, his digital clone needed to be incredibly accurate. High-definition footage of Weaving's performance was captured from multiple angles, and, using the 3D 'optical flow' data, the video-captured images could be reconstructed before being viewed from new camera angles under different lighting conditions. "Additional facial animations were created by hand, and the skin was rendered using approximations to the subsurface scattering technique," explains Borshukov, now at Electronic Arts. The combination of technical innovation and visual artistry enabled Agent Smith's photoreal digital clone to convincingly perform on the big screen.

Full body and facial capture

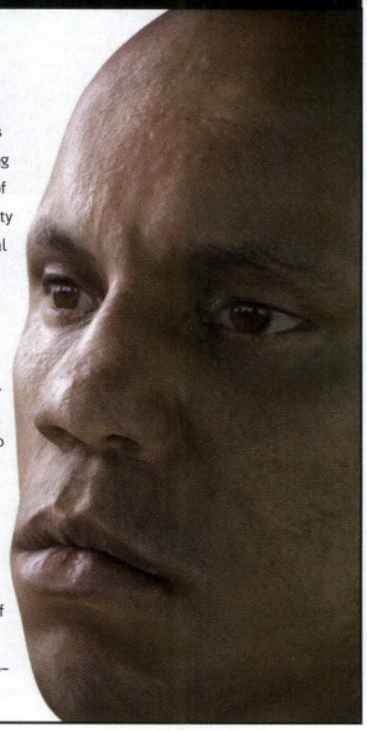
The Polar Express (2004) utilised the most complicated motion capture set-up seen on our screens to date. While the movie looks like an animated 3D feature, Robert Zemeckis actually directed his actors' performances as he would for a live-action film. Motion was captured on three stages: a large 60x25ft area where 120 cameras captured full-body data for blocking shots; a second stage for stunt work; and finally a 10x10ft stage with 64 newly acquired Vicon Peak MCam2 motion capture cameras that facilitated simultaneous full body and facial capture. As Rob Bredow, Digital Effects Supervisor at Sony Pictures Imageworks, explains: "We thought the small stage would only be used for a small percentage of the shots. We quickly realised that 80-90 per cent of the time, people wanted to work with >

"Eyes aren't just the windows of the soul – they're the part of the human face to which your own eye goes first"

Rob Bredow, digital effects supervisor, SPI

Multiple HD footage of actor Hugo Weaving's face was used to reconstruct a virtual Agent Smith for the 'superpunch' sequence of The Matrix Revolutions. The same technique is now being applied to games

Digital cloning



THE BIG IDEA "There's no 'big idea'. It's a simple idea: start from the real thing by scanning, motion capturing and photographing a real person, then figure out how to manipulate the data to give you what you want," says Electronic Arts' George Borshukov. "Digital face cloning offers a solution to facial animation in which the face of an actor is digitised using recording devices. The beauty of this is that there's no need for modelling any physical properties of the face. They're captured in the data."

WHO'S WORKING ON IT? Worldwide Studios, Electronic Arts

WHAT DOES IT INVOLVE? The actor, or his 'life cast', is cyber-scanned to acquire real pore and wrinkle detail. Skin reflectance is approximated or collected. Animation data is gathered via motion capture or video analysis, re-targeted and then used to drive the character model.

PROS A more realistic facial model, in terms of both appearance and animation.

CONS The data is hard to edit – what you capture is very much what you get. There's a limit to the amount of data that can be acquired through a capture process.

IN FIVE YEARS A standard process with a beginning-to-end off-the-shelf solution.

Next-generation crowd simulation

THE BIG IDEA An artificial life system that emulates processes used by nature to drive autonomous agents. When scaled up into the hundreds or thousands, the interaction within the crowd that emerges from these individuals is highly realistic.

WHO'S WORKING ON IT? Massive Software has developed a commercial range of products. Various visual effects and games studios, including Electronic Arts, the Moving Picture Company and Sony Pictures Imageworks, have developed proprietary systems.

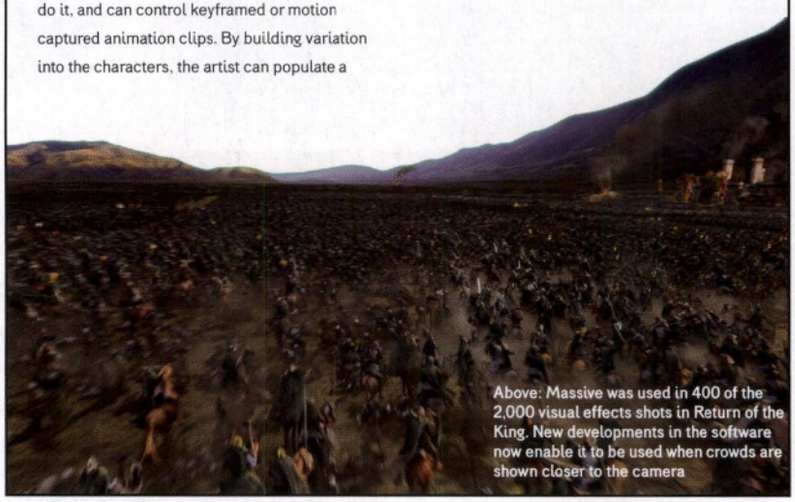
WHAT DOES IT INVOLVE? A technical director designs characters with a set of reactions to what's going on around them. These reactions determine what these 'agents' do and how they do it, and can control keyframed or motion captured animation clips. By building variation into the characters, the artist can populate a scene with individuals who are unique in physical appearance and responses.

PROS Resulting simulations are far more convincing than traditional particle animation techniques.

CONS Render options are often limited to RIB export, and RenderMan or hardware-accelerated rendering.

IN ONE YEAR "Secondary characters created with Massive will hold up well, even on close-up shots," says Stephen Regelous, Founder of Massive Software.

IN FIVE YEARS Hero performances from autonomous digital characters.



Above: Massive was used in 400 of the 2,000 visual effects shots in Return of the King. New developments in the software now enable it to be used when crowds are shown closer to the camera

Above: Alice enabled MPC to motion capture a single actor, Deep Roy, duplicate him over 50 times, then place the resulting doubles into the same shot

"No one knows what's wrong with current virtual faces. Ask, and you'll get different answers, all of them vague"

JP Lewis, CTO, Graphics Primitive

full body and facial capture. It was the first time that motion capture had been performed on body and face simultaneously, and gave actors more leeway to ad lib their performances." Despite the vast amounts of data recorded, animation on every shot was still tweaked by hand, and lip movements (notoriously difficult to get through mocap alone) were always hand-animated. Much of the work on *The Polar Express* went into getting the eyes right. "Not only are the eyes the window of the soul, but they're also where your eye goes to first," says Bredow.

Artificial life

Getting one virtual actor looking good is quite some achievement; getting hundreds to look good is another matter entirely. Historical methods for digital crowd control used particle effects, but modern techniques engineer crowds as groups of autonomous individuals, or agents. Stephen Regelous of Massive Software, creator of the celebrated Massive crowd-simulation system, says: "Massive emulates processes found in nature. By implementing machine vision and sound propagation, agents can see and hear each other. Agents react, as they would in life, in response to stimuli, so crowds appear highly convincing."

Other 3D studios have developed proprietary systems. To manage the vast crowds required in *Troy*, the Moving Picture Company developed Alice (Artificial Life Crowd Engine). Since then, it has been utilised in many films, including *Kingdom of Heaven*, *Alexander* and *Charlie and the Chocolate Factory*. According to MPC's development team: "Motion capture data is piped into our Motion Library Editor (MLE), a proprietary tool that finds relationships between clips. Technical directors specify what kind of clips they'll need for a given shot. MLE hunts through the available mocap clips to find those elements, then selects and combines them to create the best blend. Alice takes this data and enables the VFX artist to lay out crowd elements of the shot, as well as define other rules that will govern the crowd's behaviour."

Leaving the uncanny valley

In 1978, roboticist Dr Masahiro Mori plotted emotional response against similarity to human appearance and movement in a study designed to provide insight into psychological reaction to robot design. The results were startling. The closer that robots, or indeed synthetic humans, come to resembling ourselves, the more positive our emotional response towards them – up to a point. But as the similarity of a robot to a real human approaches 95 per cent, we suddenly start to describe its appearance as creepy – like a corpse brought to life. This sudden swing from positive to negative, referred to as the 'Uncanny Valley', is even greater as the motion of a synthetic character approaches, but doesn't quite reach, a 100 per cent resemblance to human motion. Most video games today don't engage players' empathy to their full potential because their levels of realism fall into this Uncanny Valley. George Borshukov of Electronic Arts argues that through reconstructing virtual humans from real-life source data, we can climb out of the Uncanny Valley and set a new level of photorealism (see boxout: 'Digital cloning').

Borshukov's latest work, with Electronic Arts' Worldwide Studios, extends the technology developed for the *Matrix* sequels through its application to game design. In its concept demo for *Fight Night Round 3*, a next-gen game for the Xbox 360 and PlayStation 3, real-life video and performance data is used to reconstruct two photoreal boxers as they fight head to head in the ring. What's truly outstanding is that these fighters are rendered in real-time. Electronic Arts is guarded about revealing its product roadmaps, but when pressed, Borshukov admits that, within the next two years, we could see this kind of technology applied to primary characters in next-generation games.

That elusive 'something'

Over the last five years, we've seen some amazing and beautiful images of digital humans, but the general consensus is that when it comes to lead characters who remain in shot for anything more than a split second, the technology has some way to go before it passes the Turing test (a proposal by the pioneering computer scientist for a test of a machine's capability to perform human-like conversation) of the 3D world at large. Ed Hooks, author of Acting for Animators, notes: "We're creating the digital human for a very discriminating audience: other humans. We're all expert at recognising our own kind and do so in the blink of an eye."

Psychologists studying this phenomenon believe it's likely that human facial recognition is built into our genetics. Clinical psychologist Dr Claire Gould tells us: "Newborn children appear to be genetically predisposed to recognising the human face, particularly faces where expressions change, rather than faces where expressions remain constant."

Researcher JP Lewis, CTO of Graphics Primitive, studied people's impressions of synthetic humans. He showed 15 sets of CG and real faces, first for a quarter of a second, then for one second, and then five seconds. The subjects judged which faces were CG and which were real. Lewis reports: "People are quite accurate at a quarter second, [which] gives us a clue that something fairly basic is still wrong – a quarter second isn't enough time to process details." The study also revealed that "no one knows what's wrong with the current faces. Ask three people and you'll get three different answers, all vague – like 'something is wrong with the eyes'. As long as we can't say what's wrong, this is going to be hard to fix. It may be that, once figured out, [the solution] is easy to implement and allows all subsequent virtual actors to be perceived as real. Somehow, I doubt this."

But do we want our virtual characters to look truly photoreal? Sometimes, certainly, but as an art form, Rob Bredow believes that the most interesting challenges lie in creating stylised realistic humans. This, certainly, is an skill that artists and technologists will soon master. In the meantime, the concept of Human 2.0 is mature, living and (almost) breathing. ■

"Through reconstructing virtual humans from real-life source data, we may be able to climb out of the 'uncanny valley' and set a new standard for photorealism"

George Borshukov, CG Supervisor, Electronic Arts

Where will they be in five years?

VIRTUAL EYES

George Borshukov

Computer Graphics Supervisor, Worldwide Studios, Electronic Arts

"I hope that we will have figured out how to 'learn' from captured data libraries, which would allow us to produce results with the same fidelity as the UCAP [Universal Capture] approach, but for situations not actually captured. The eye area will probably be tackled, as people now admit how important, yet extremely difficult, it is to get right."

VIRTUAL SKIN

Rob Bredow

Digital Effects Supervisor, Sony Pictures Imageworks

"We'll see more close-ups of convincing photoreal virtual humans. Shading on the skin, lighting and the motion of the eyes will all get much better and become a little easier. We'll be seeing some highly realistic digital characters, setting a new high bar [for photorealism] in the next five years. The more time a studio spends on a shot, the better it will look. "

VIRTUAL BRAINS

Stephen Regelous

Founder and Product Manager, Massive Software

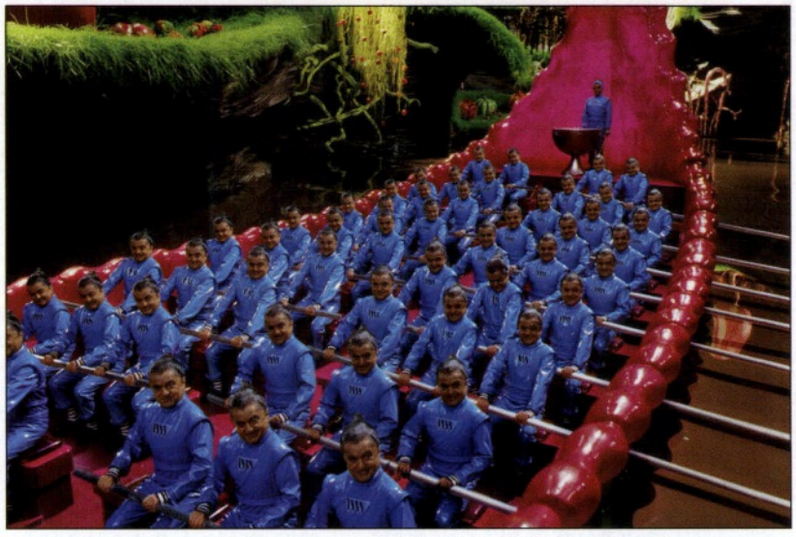
"We'll see an emphasis on hero performances of autonomous, digital characters, driven by artificial life systems. Agents [virtual characters within the system] will hold up in more demanding situations, and will be convincing even when closer to camera. Secondary characters will already be looking very good."

VIRTUAL MUSCLES

Ron Fedkiw

Assistant Professor, Computer Science Department, Stanford University

"One of my friends at a major studio recently said that he thought it may take ten years to get this sort of technology [determining underlying muscle activation in the human face from mocap data] into films. My reply was that he would find himself nine years behind next year when we do. That is, I'm very optimistic."



Above: Proprietary alternatives to the well-known Massive crowd-simulation system include MPC's Alice, as used in this shot from *Charlie and the Chocolate Factory*

CG LIGHTING MASTERCLASS

[Illustration] Nicholas Boughen [w] www.rainmaker.com

Get started

All the resources to follow this tutorial can be found on the CD, in the Tutorials\Get Started in CG Lighting

Over the next ten pages we'll be exploring the techniques required to create subtle, flexible and natural-looking lighting set-ups. By **Nicholas Boughen**

Welcome to the world of computer-generated lighting. In this tutorial you'll uncover the path to accurate CG light, focusing on *LightWave 3D*, although you'll find that the principles described apply equally to any 3D application.

We'll start by tackling the five lighting instruments available in *LightWave*. You'll learn the vast differences between these 'fake' CG lights and the behaviour of lights in the real world, find out how to create better-looking renders, and finish up by generating a simple, four-point lighting set-up.

After that we'll look at some advanced lighting tools, discover some tricks to force CG lights to behave like real lights, and find out how to analyse and set up both an indoor and outdoor lighting environment. All the supporting objects, images and scene files can be found on the CD.

Before we begin the tutorial, it's crucial to understand that all real lights and their shadows have the same basic properties – unlike the five different types of CG light and the wide array of properties you can select. In reality, lights have four characteristics. First, they have physical dimensions, and do not exist as a single point in space. Second, they radiate omnidirectional light from their entire luminous surface (the filament or fluorescent tube, for example). Third, lights cast shadows that are sharp near the object casting them, but become increasingly soft the further you travel from their source (go outside on a sunny day and have a look at a shadow cast by a lamppost – it will be very sharp near the post, but soften along its length). Finally, all lights cause shadows that will soften more gradually over distance if the light is very small, and more abruptly if the light source is large. A huge light source – such as the sky – will produce immediately soft shadows.

Armed with this know-how, it's time to delve into *LightWave* and start exploring the world of natural CG lighting. We'll start off slowly, and refine the test scene as we go.

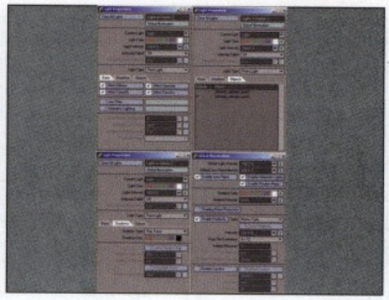
Part 1: Understanding LightWave lights

We'll start with a quick look at the five different light styles

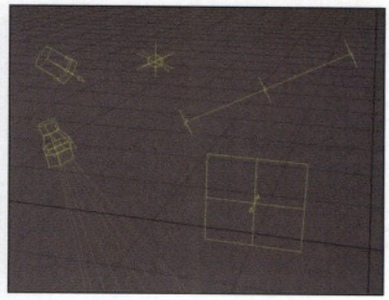
Working with shadows

Raytraced shadows from Distant, Point or Spot lights are always hard-edged, because the rays either emit from a single point or are perfectly parallel (unlike illumination from real lights). Shadow maps enable us to use Shadow Fuzziness, which blurs the edge of shadows and adds realism. Be aware, though, that while real shadows change in sharpness based on their distance from the object casting them, shadow map 'fuzziness' doesn't. It's exactly the same all over the shadow, so if your shadow is too fuzzy or soft, it will soon begin to look unrealistic.

1 This photograph demonstrates some basic light properties. The shadow edges lying furthest away from the sunglasses have softened slightly (not much, because the shadow lies just a couple of centimetres away). If you do the lamppost experiment mentioned in our introduction, you'll see an obvious softening several metres away at the top of the lamppost shadow.



2 Open *LightWave*. Light types and their respective shadow types, object exclusions and advanced parameters can be set in the Lights Properties panel. Open this by selecting any light and pressing the P key. Advanced parameters can be accessed by clicking the Global Illumination button on the main Lights Properties panel. Let's run through what each light type does.

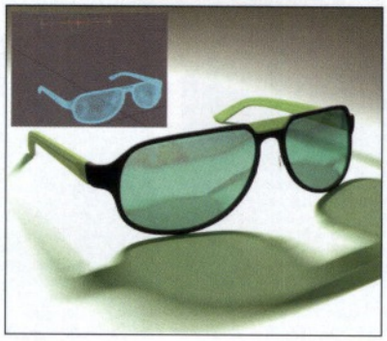


3 The Distant light casts all parallel rays, partly like the sun. The Point light acts a little like a tiny LED while, as you would expect, *LightWave's* Spot light acts like a spotlight; a cone angle setting defines where the light shines. The Linear light performs somewhat like a fluorescent tube, and the Area light acts like a window, a computer monitor, or just about any light you may need.

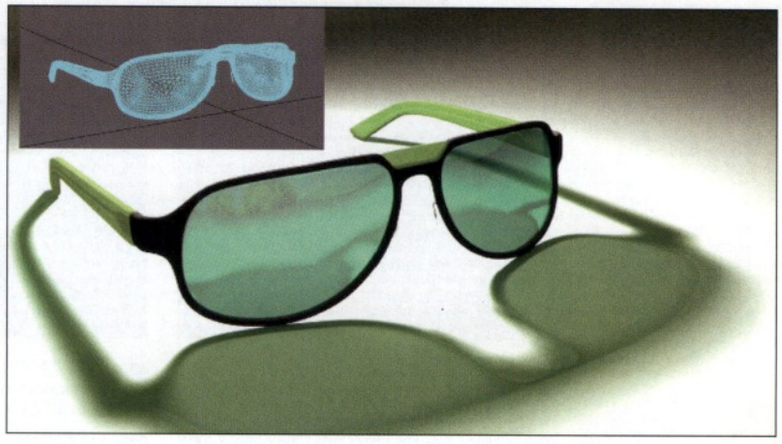
4 The Distant light is meant to simulate sunlight. All light rays from this instrument are parallel, therefore shadows cast by objects are always exactly the same size as the object. Shadow edges are always hard. You can probably already see some major limitations of using this light as a 'real' light source.

5 The Point light emits omnidirectional light rays from a single non-dimensional point in space. Once again, shadows are always hard-edged. Like the distant light, this one also displays only one or two of the properties of real light.

6 The Spot light is similar to the Point light, but the angle of its light cone can be adjusted, the cone edge can be made soft or hard, and it can use either raytraced shadows or shadow maps. The Spot light is the most commonly used light in *LightWave* scenes due to its flexibility and low render times. Shadow maps enable artists to 'fake' soft shadow edges.



7 As you've probably already discovered, the Linear light is a strange beast. It acts like a string of Point lights, which is actually how this sort of light was made in the old days, and it's meant to provide a cheap alternative to lights such as fluorescent tubes. Notice that the shadows soften along the width of the glasses but not the length, making strange, rather unrealistic shadows.



8 The Area light is the most attractive and physically accurate light in the toolbox. This type creates natural-looking shadows that soften along two axes and become softer further away from the object, just as they would in the real world. The main drawback to area lights is that they take a long time to render, but this is only a minor inconvenience if you're looking for stunning results.

Part 2: Creating a simple four light set-up

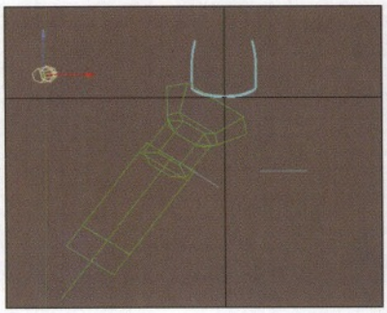
Create key, rim, fill and bounce lights, and configure their direction, intensity and colour

What is four-point lighting?

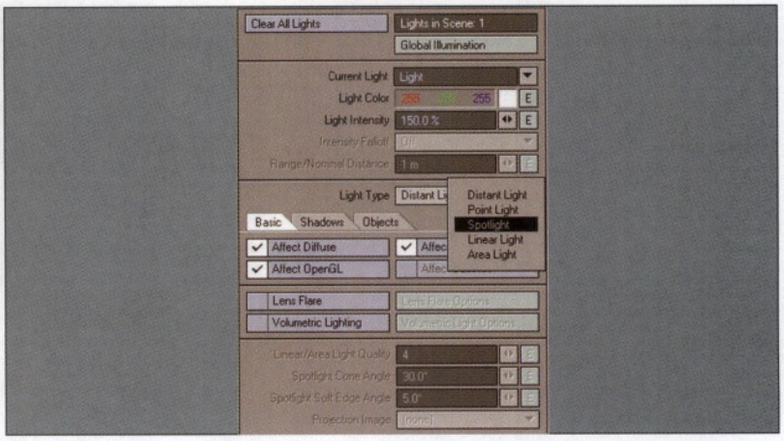
Most CG artists are familiar with the term three-point lighting. This refers to a 'key', or main light source, a 'fill' source to fill in the shadows, and a 'rim' light to highlight the edges of the object in the shot. What is missing from this recipe is a 'bounce' light. In the real world, the key, fill and rim lights would reflect off the floor, adding reflected illumination from below. However, since most renders are done without light bounces (radiosity) turned on, adding a fourth light from below will simulate this effect without the render times, increasing realism.

Lighting angles

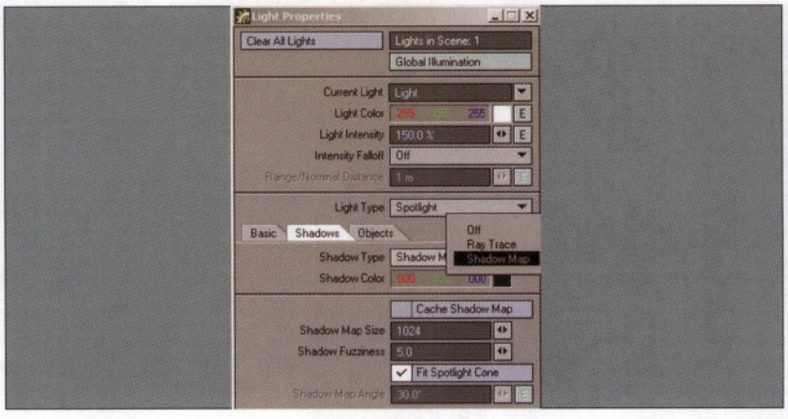
For a good three- or four-point lighting set-up, the Key and Fill lights should start on opposite sides of the camera axis, each at an angle of 45 degrees to that axis, and point downwards (in pitch) by 45 degrees. This will provide even coverage for the camera, plus good form, definition and colour mixing over the sides of the object facing the camera. Rim lights usually sit directly opposite the camera, and are more steeply angled to get a 'halo' of light around the object. The Bounce light sits at a point below from which its light is visible; the angle isn't crucial.



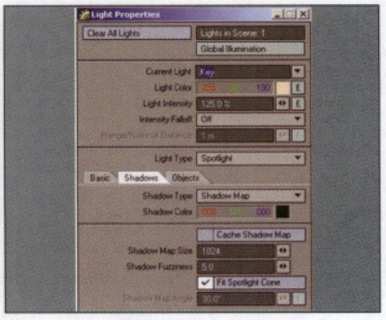
1 Open the scene called 3dw_LWLighting_part1.lws from the CD. Notice that you're currently in the Top view, which is the best place to start aiming lights. There's one Distant light in this scene. Switch to Lights mode at the bottom-left corner of the interface, or use the Shift+L shortcut, then select the light. Hit the P key to open the Light Properties panel.



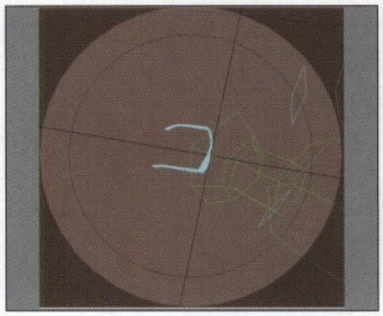
2 About halfway down the Light Properties panel you'll see 'Light Type' with a drop-down menu beside it. Open the menu and change the Light Type from Distant Light to Spot Light. This is where you would also change a light to one of the other types if required.



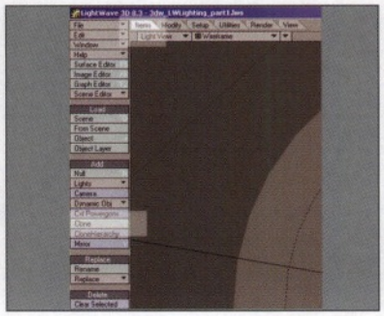
3 Just below Light Type you'll find three tabs. Click the Shadows tab to access the shadow's parameters. Next to Shadow Type, there's another drop-down menu; open this and switch the Shadow Type to Shadow Map. You could also select 'None' if you don't want your light to cast any shadows. Set the Shadow Map Size to 1,024 and the Shadow Fuzziness to 5. Leave all the other settings as they are.



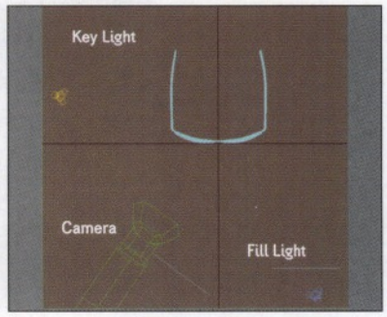
4 Near the top, beside Current Light, double-click the light name and edit it so it says 'Key'. Set the Light Intensity to 125% by clicking inside the Light Intensity box and typing the new value. Change the RGB values by clicking on each of the RGB numbers one at a time, and dragging to the left or right until the desired number is set. Use the values 255, 221, 190.



5 Now we'll position the light. Hit the 5 key to enter Light View mode. Hit T to enter Move mode, and use the mouse to position the light while you're viewing it. The LMB covers the X and Z axes; the RMB covers the Y axis of movement. Try it out – it's a fun way to position a light. Make the view similar to the above image.



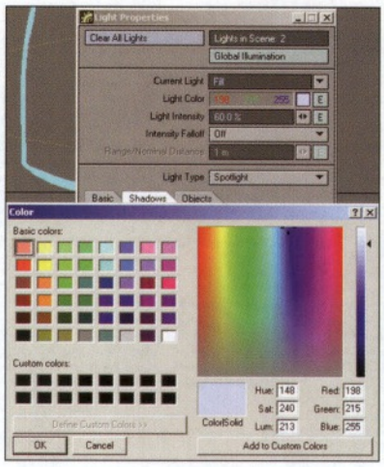
6 Check the upper-left corner of the *LightWave* interface to ensure you're currently in the Items tab. Along the left bar, find the Clone button or press Ctrl/Command+C to clone the light. When the dialog box appears, simply click OK to make one clone. Now open the Light Properties panel, if it isn't already open, and rename the new light you've created (also called 'Key') to 'Fill'.



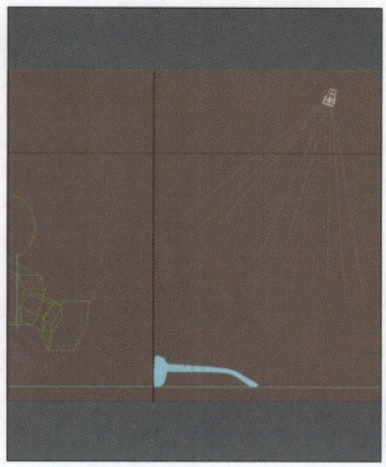
7 With the new Fill light selected, enter Top view (press 2) and position the Fill light on the side of the camera opposite the Key light. Now roughly position the light using the Top View, and fine-tune the position using the Light view (press 5).

Rim light intensity

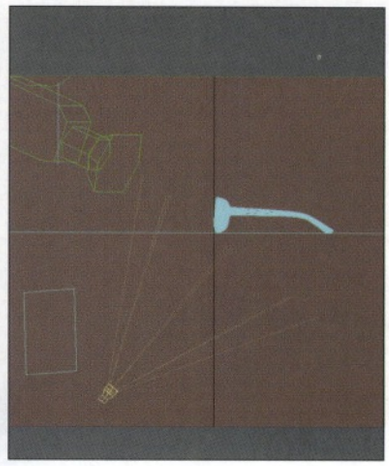
The Rim light provides a highlight along the outline of the object in frame. Since there's already a Key light and a Fill light adding light intensity to the scene, you'll need to make your Rim intensity bright enough to cut through both. While lighting requirements and situations vary, it's useful to start by adding the intensity of the Key and Fill lights together. So, where the Key is 125% and the Fill is about half of that at 60%, the Rim will start at 185%. Once you've rendered, you'll know whether you need to modify this value.



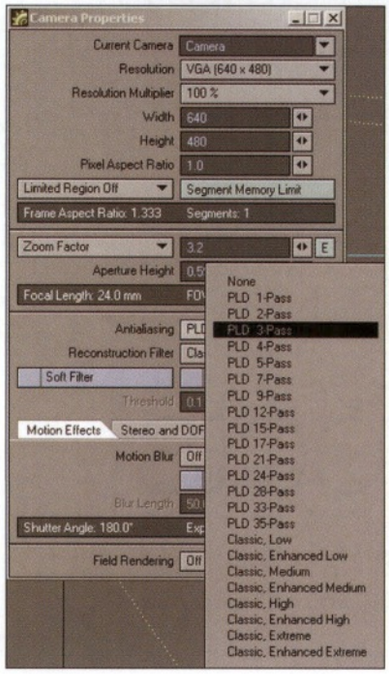
8 Set the Light Intensity of the Fill light by clicking and holding the 'spinner' – the little box with arrows just to the right of the Light Intensity value. Set the Intensity to 60%. Now adjust the Light Color box by clicking on the colour swatch to the right of the RGB values. Set the Hue, Sat and Lum boxes to values of 148, 240, 213. You'll notice that the Fill light is now light blue.



9 Clone the Fill light once, then rename it 'Rim'. Set the Intensity to 150% and, this time, switch the colour to white, or RGB 255, 255, 255. Now position the light behind the sunglasses, directly opposite the camera and pointing down on to the sunglasses, as in the image above.



10 Clone the Rim light and rename it 'Bounce'. Set Intensity to 25% and the colour to 254, 227, 167. This is similar to the colour of stonewall.jpg, which has been applied to the ground texture. Position the light below the camera, and aim it up at the glasses. Open the Objects tab on the Properties panel and exclude 3dw_ground. Switch to the Rim light and exclude the ground layer from it.



11 At the bottom of the interface select Camera mode, or use Shift+C to select the camera. Press P to open the Camera Properties panel. Halfway down, find the Anti-aliasing drop-down menu; open this and select 'PLD 3-Pass' for smooth anti-aliasing. Leave all the other settings as they are, and press F9 for a preview render.

12 Analysing this render, I've decided to make some changes. I've moved the Key light further camera-left for better composition. Note that the amber Key light and the blue Fill light mix to near-white on most parts of the image, but where one or the other is occluded, the shadow colour is different. This is how real-world lighting works: notice on a sunny day how the lighting within shadows is tinted blue by the skylight. Skylight falls everywhere, but you only really notice it in the shadows. Everywhere else, it mixes with the relatively amber sunlight to create near-white light. Also note that, in this scene, the fuzzy shadow maps are soft everywhere, unlike real shadows. The final settings can be found in the scene called 3dw_LWLighting_part1_finished.lws on the CD.

[Illustration] Nicholas Boughen [w] www.rainmaker.com

Advanced effects

Now let's take a look at the advanced lighting tools in *LightWave 3D* – by following the walkthrough you can create the dazzling set-up shown above

In this part of the tutorial you'll discover the advanced lighting tools in *LightWave's* Global Illumination panel, including Backdrop Only radiosity, then set up a simple but effective lighting rig using image-based lighting and a single, small Area light.

First, an explanation of a key lighting term: radiosity. In the real world, all light bounces and reflects around the environment until it's absorbed. These reflections can occur hundreds, thousands or even millions of times depending on the surface properties of the environment. CG lights, on the other hand, do not reflect by default; all of the light from CG sources is absorbed. This means that 3D renderers need to deliberately calculate light-ray reflections.

In the old days, before radiosity was available as a rendering feature, 3D artists used to fake it, cleverly placing lighting instruments to mimic the way light bounces. This trick is still used, but is fast becoming a lost art; as renderers and hardware become quicker and smarter, the need for fakes, tricks and hacks is diminishing. Beautiful, more physically accurate lighting can now be produced with much less effort. Be aware, however, that advanced lighting requires longer render times. If your goal is to create photorealistic effects and truly stunning renders, then you'll find that the effects you can create are well worth the wait.

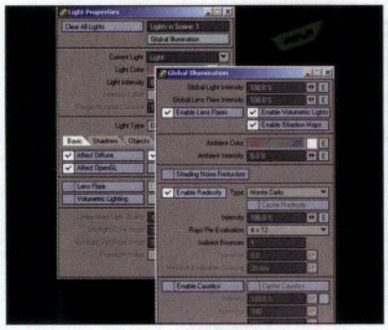
Start by opening *LightWave* and loading up the scene named '3dw_LWLighting_part2.lws' from the CD. Click on the Lights mode button at the bottom of the interface, then hit the P key to open the Light Properties panel. You're now ready to begin.

Part 1: Advanced tools

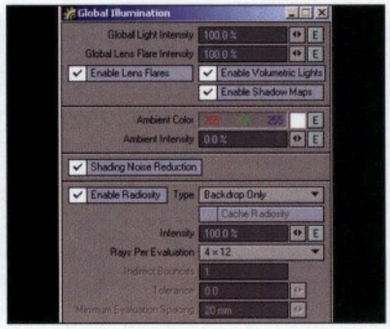
Use the Global Illuminations panel and Backdrop options to create a more intricately lit scene

Types of radiosity

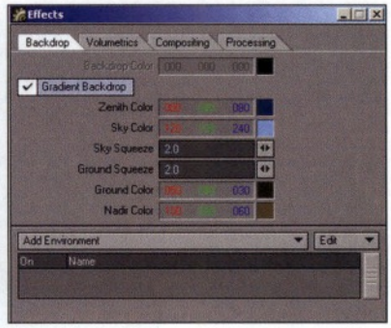
Backdrop Only radiosity is like Ambient Occlusion: no radiosity bounces are calculated, but light is emitted from the entire backdrop. It's a great way to simulate skylight. The backdrop does have to have some colour in it, so set a colour, a gradient or an image into the backdrop. Monte Carlo radiosity will calculate radiosity bounces, yet takes longer to render; the more bounces you add, the longer the frame will take. Interpolated radiosity enables you to shorten render times by letting the renderer 'guess' the lighting values in a scene.



1 At the top of the Light Properties panel, click Global Illumination (GI) to open the GI panel. From here you can globally change Light Intensity, enable Lens Flares, Volumetric Lights, Shadow Maps and Ambient Intensity. You can manage the Ambient Color settings and enable either Radiosity or Caustics. Shading Noise Reduction improves lighting quality for Radiosity and Area lights.



2 In the Global Illumination panel, set Ambient Intensity to 0%, turn on Shading Noise Reduction and enable Radiosity. Click in the drop-down box next to Type and select Backdrop Only from the list. Leave all the other settings as they are.

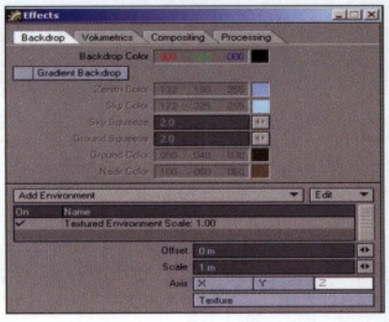


3 Press Ctrl+F5 to open the Backdrop Options. Click on the Gradient Backdrop box to add a generic Sky/Ground gradient. This quick gradient is useful for test renders. Set Zenith Colour to 132, 190, 255 and Sky Colour to 172, 225, 255. For more complex renders, click the Add Environment bar at the bottom and Add Textured Environment to insert an image or a custom gradient.

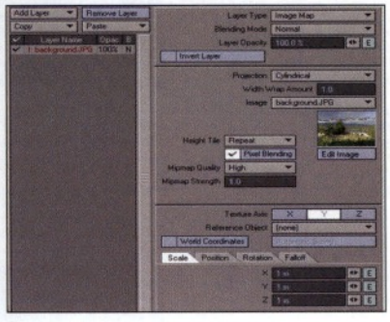
Two techniques

This tutorial demonstrates the versatility of image-based lighting. Whether you use photos in the backdrop or hand-drawn images, you have specific control over how the image illuminates your scene. For most everyday purposes, this technique may take too long to render if you don't have access to a render farm, so mix image-based lighting with instrument lighting. It's useful to choose an appropriate backdrop image for your Fill light source and provide a more direct light source through a Spot light, Area light or Distant light.

4 Click on the Lights mode button at the bottom of the interface and then press the P key to open the Light Properties panel. Be sure that Light Intensity is set to 0% before continuing. Render the image by clicking F9. Although the only light in the scene is turned off, the scene is still illuminated, because we have instructed *LightWave* to emit illumination from the backdrop.



5 Open the Backdrop panel again and turn off Gradient Backdrop. Click on the Add Environment bar, then on Add Textured Environment. Now click Textured Environment, select the Y axis, and click on Texture to open the Texture panel.



6 Set the Layer Type to Image Map. Set Projection to Cylindrical and the Texture Axis to Y, then open the Image drop-down menu to load the image background.jpg from the cover CD. You can leave all the other settings in the panel as they are.

7 The first thing you'll notice when rendering this image is that the light colour is extremely varied. Because this light colour is taken from the image – which is an outdoor photograph – you can see highlights in the render caused by coloured light coming from many directions. This effect is called image-based lighting, and it adds a brilliant level of detail.

8 Open the Image Editor by typing F6. Select the image called background.jpg, and click the Replace button to replace it with white-square.jpg. As you may expect, this is black with a white square in it. Wherever the image is black, no light will be emitted from the backdrop; wherever the image is white, light will be emitted. Now render the frame.

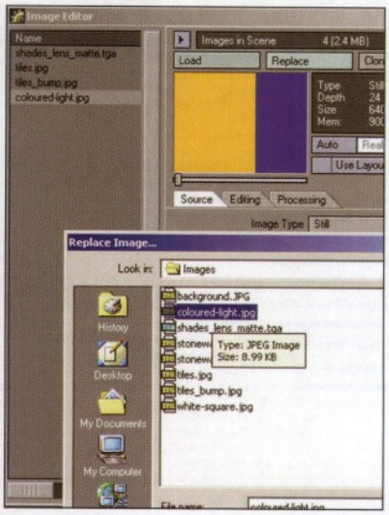
Advanced lighting tools, continued

Changing the colour of the background will change the lighting effect dramatically

Animating colours

There are many ways to illuminate your scene using Backdrop Only radiosity. In this tutorial we used a simple gradient backdrop, but you have the option of using anything that can be put in a Texture panel, including photographs, HDRI, procedural textures, plain colours or custom gradients. You can even animate these over time: you may want to produce a time-lapse scene of the sun rising or setting, or of a vehicle driving past in the night. You could also simulate a nuclear blast in the distance – the options are endless.

9 Note how much this technique mimics the use of a single, large Area light in the scene. You can see clearly that the light source comes from the left of the frame – this is where the white portion of the image exists in the backdrop. Let's try adding some colour now. Using the Image Editor again, replace the image named white-square.jpg with coloured-light.jpg.



10 Because we're creating a lighting rig via image-based lighting, we've specifically placed and coloured the squares so that they match the position and colour of lighting instruments. There's one main disadvantage to this system: since there's only one Radiosity Intensity value, all lights in the scene will have the same level of intensity unless the Color value is carefully adjusted for each square.

11 Press F9 to render. Notice that the tile floor seems quite blue. This is because it has Reflectivity turned on, and in addition to being illuminated by the blue side, this is also reflecting that colour. There are amber highlights along the tile edges, and if you look closely, you'll see two shadows: one occluded from the blue side and one from the amber side, indicating two distinct light sources.

12 For the final image, pictured above, we've replaced the backdrop image with the original background photo. This produces a good Ambient and Fill light solution. We want the glasses to appear to be outside, so we've also added an Area light with the right size and intensity to simulate sunlight. If you recall from the previous tutorial, the shadows should be quite hard-edged, with a little softness at their furthest point from the glasses. Load the scene '3dw_LWLighting_part2_finished.lws' to see the final set-up. You could easily switch the Backdrop radiosity to Monte Carlo radiosity, to try out radiosity light bounces. However, with this object, much of the material is quite dark and most of it is semi-transparent, so it's unlikely that you'll see much difference.

[Illustration] Nicholas Boughen [w] www.rainmaker.com

Real-world effects

To produce truly realistic renders, CG lights must be made to behave like real-world lights. We'll explore two time-saving tricks for making them do so

To finish off we're going to show you how to make CG lights act more like real light, using two common tricks to get around the increase in render times that this would otherwise entail. You'll discover how to analyse and set up simple indoor and outdoor lighting environments.

So how do CG lights differ from their real equivalents? In the real world, all light sources have size and radiate light from their entire luminous surface: the filament, tube or flame. In contrast, *LightWave's* Point and Spot lights radiate light from a single point (a cheap but inaccurate render trick). Distant lights don't radiate light at all – their rays are parallel, not physically accurate. Linear lights emit light from a line, and Area lights emit light from a plane. The result is that Point, Spot and Distant lights create unrealistic hard-edged shadows; Linear lights create shadows that are hard along two axes and soft along the third; while Area Lights create the most natural and physically correct shadows – but only at the expense of render speed.

So if you don't want to wait for Area lights to render, how do you force the other, faster lighting tools to behave more like natural lights? In a nutshell, you take each light type and use it in such a way that adds-in the missing properties. First we'll demonstrate the celebrated 'spinning light trick', and then we'll show you how to combine Point or Linear lights into an array. In each case, the result we are seeking is shadows that are hard-edged where the object casting them touches the ground, and become softer as they project from the object.

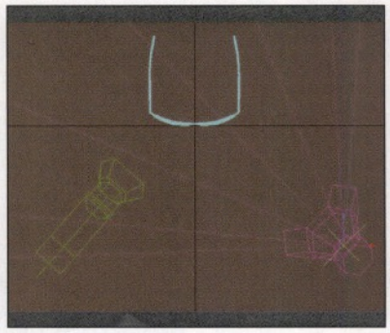
Part 1: The spinning light trick

Rotate the light and overlay multiple render passes to blur and soften shadows

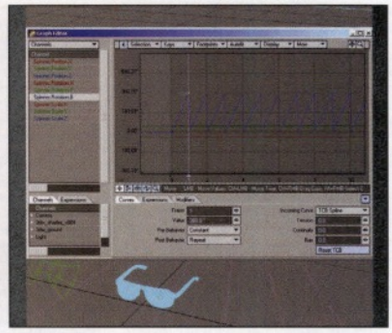
Spinning light: an overview

This trick uses motion blur to soften hard-edged shadows cast by light types that normally create them. To do this, we need to attach the light to a null, and rotate it through 360 degrees once every frame. Since each frame is rendered in several passes to create the impression of blur, the light position will change with each render pass (if we render 5-Pass antialiasing, the light will render in five different positions). Once these different passes are overlaid, the motion-blurred hard shadows blend together to form a single, natural-looking soft shadow.

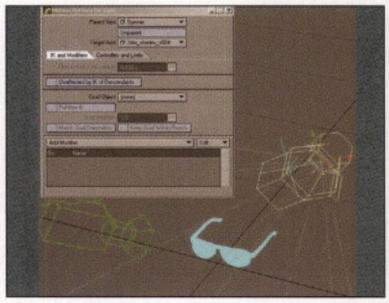
1 Open the start scene file, 3dw_LWLighting_part3.lws, from the CD. When you open the classic Scene Editor from the upper-left of the Layout interface, you'll notice that the Spot light is parented to a null called Spinner which is not yet moving. Hit F9 to render out a still frame of the scene.



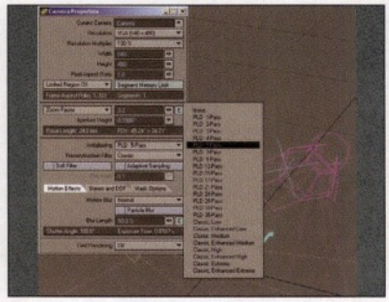
2 Clear the Render Status window by clicking on Abort or Continue. Now hit 2 to enter Top View. You can see that the light and the Spinner null occupy the same position. Be sure that you're on frame 0. Select Lights mode from the bottom-left of the interface. Type T to enter Move mode and type in an X value of 32mm. If you don't have Autokey on, set a key by hitting the Enter key twice.



3 Enter Objects mode by typing O. Select the Spinner null from the Scene Editor and advance to frame 1. Type Y to enter Rotate mode. Now enter a Bank value of 360 and set another keyframe. Open the Graph Editor by pressing Ctrl+F2, select the Spinner.Rotation.B channel and set Post Behavior to Repeat. As you can see in the graph, the light will now rotate 360 degrees every frame.



4 Now select the light again from the Scene Editor and press M to open the light's Motion Options panel. Near the top of the panel you'll see a drop-down menu for 'Target Item'. Select the object 3dw_shades_v004 as the Target Item. The Spot light will now always point at the sunglasses, and a dotted, orange target line has appeared. Before continuing, be sure that you're on frame 1.



5 Open the Camera Properties panel by selecting the camera and hitting P. Halfway down the panel, set Antialiasing to PLD 5-Pass. This will give us five interpolated light positions. Set Motion Blur to Normal and render by pressing F9. To speed up our initial renders, open the Render Options panel and turn off Ray Trace Reflection, Ray Trace Refraction and Ray Trace Transparency.

6 Because we're only using five render passes, you can clearly see the shadow lines from each one. To improve the effect, we need to increase the number of passes. In the Camera Properties panel, set Antialiasing to PLD 15-Pass and re-render. You can soften the shadow edges by increasing Shadow Fuzziness on the Light Properties > Shadows panel. Set it to 3 now.

7 The shadow lines have blurred to create softer shadows – these look much the same as shadows of Area lights, but in a fraction of the render time. You can also make the light source appear larger. Moving the Spot light away from the Spinner increases the area of the 'virtual' Area light. Select the light, and set the X position value to 100mm. Set a keyframe at frame 0 and re-render.

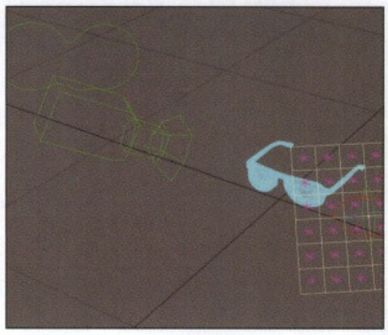
8 Note that as the shadow becomes softer and wider, more antialiasing passes are needed to 'hide' the shadow lines. Numerous variations of this spinning light trick have been used for at least 15 years, and it was invented long before Area lights existed. It's still used regularly in TV and feature films. To see the completed scene file, open 3dw_LWLighting_part3_finished.lws from the CD.

Part 2: Light arrays

Use multiple lights to simulate the effect of a single area light

Other methods

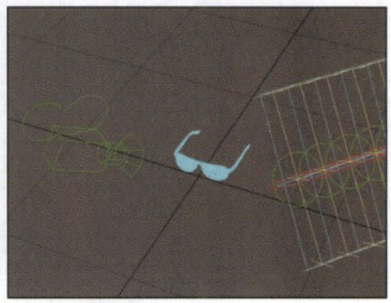
These techniques are just two of many possible variations that could be employed to save valuable hours at deadline – resourceful 3D artists will know that it's wise to keep on looking for ways to render more quickly, and it's best to render only to the quality level required (never higher!).



1 Now load 3dw_LWLighting_part3_point_array.lws from the CD. This array of Point lights was created using Luxigons – a very quick tool for this kind of job. For details, consult the manual. Alternatively, you can simply clone and manually place lights until they are all in the desired position. Be sure that all lights are parented to a null or other item, so they can be moved as one light.

2 Press F9 to render and you'll see that the Point lights work together to act like a single Area light source. Since there are 36 lights in this array, each light has an intensity of 4%, totalling 144% light intensity. Now, pick one of the Point lights and turn its light intensity up to 144%. Turn all the other lights off.

3 You can see that the behaviour of a single Point light is significantly inferior to an array. The trick here is to use as few Point lights as possible to achieve the desired shadow quality. If you make an array of a thousand point lights, it will probably take just as long as an Area light to render. Remember: the reason for using these tricks, rather than a real Area light, is to reduce render times.



4 Linear lights can also be used in an array. Open the scene 3dw_LWLighting_part3_linear_array.lws. There are six Linear lights in use here, again created using Luxigons. Because the main deficiency of Linear lights is their lack of width, we've compensated for this by placing them parallel to one another. Now press F9 to render-out the image and you'll see a similar shadow result to the Point light array render.

4 This render shows the main weakness of an array that contains too few lights. If you look at the foreground shadow, you can see a shadow line for each Linear light. Adding more lights will help this, as will using the spinning light technique shown in the first part of this tutorial. Alternatively, you might simply 'jitter' the array, rather than actually spinning it.

5 An Area light was used for this final render. Comparing this image with the others, you'll see that the shadow properties are quite similar. Although a real Area light will almost always generate higher-quality results than the tricks shown in this tutorial, the render times will be much longer. There are many instances when you can get away with lower-quality arrays, and the time saved may make all the difference when it comes to either delivering your project on time or losing a client forever! ■

Crash testing

You can find all the resources needed to follow this tutorial on the CD, in the Tutorial files\Crash testing folder and in the Links section.

Leap tall buildings!
Stop speeding bullets!
Make it look like it hurts!
Your characters can perform all of these stunts and more – without any keyframe animation! By **Chris Ollis**

Endorphin is a 'Dynamic Motion Synthesis' package that uses revolutionary AI and biomechanical techniques to simulate the way in which the human body moves and the way it reacts to external stimuli. In other words, it enables you to control a virtual stuntman with a big brain and a love of acting.

Endorphin is a product that I love to get my hands on at every given opportunity. It works in a way that you wish all 3D applications would, being simple, intuitive and – assuming that the sight of CG characters being knocked down, blown up and treated in other cruel and unusual ways brings a smile to your lips – more enjoyable to use than you would think possible.

The software has been designed to create realistic human motion data that's beyond the abilities of motion-capture studios, or of real stuntmen, for that matter. It can simulate falls from a thousand feet, blows to the head from a baseball bat, and countless other stunts that would be far too dangerous to perform in reality. This tutorial will introduce you to *endorphin's* general workflow, highlighting its intuitive approach and fascinating results. We'll run through a quick and fairly basic simulation that will introduce the idea of forces and behaviours, before moving on to more complex projects that will demonstrate the vast number of possibilities available.

You can find all of the accompanying project files and animations on the CD, plus a number of bonus tutorials supplied by *endorphin's* developer, NaturalMotion. You can download the Learning Edition of *endorphin 2.6*, a free, time-unlimited trial version of the software, from **www.naturalmotion.com/pages/le.htm**.

Although the Learning Edition is export-limited, a fully licensed copy enables you to export data via the various motion-capture file formats (ASF, BVH, FBX and so on) used in your 3D application to drive a character.

Put simply, it places the power of an entire Hollywood stunt team in the hands of an independent animator. >

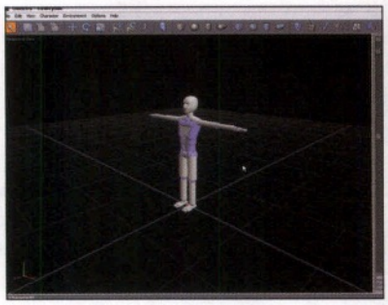
3D
3D

Part 1: Mastering the basics

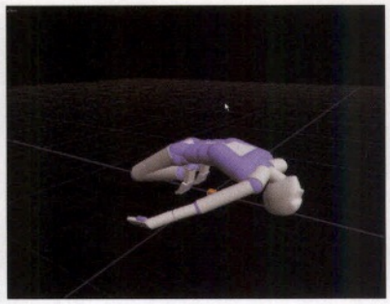
Get a feel for how *endorphin* works by hitting your character, then hitting him again...

High-speed navigation

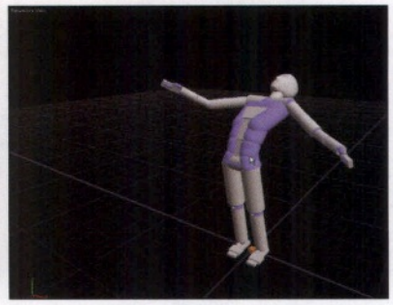
Navigation is essential in a 3D package, so here's a quick guide to *endorphin*'s simple control system. The main controller is the middle mouse button. Hold it down to rotate the viewport, and scroll it up and down to zoom in and out of the scene. Combine it with the Alt key and you can shift the view around. Other functions to remember are Ctrl+F, which zooms the viewport to the currently selected object, and Ctrl+R, which will reset the view. Using these, you should be able to move about as fast as *endorphin* can run its simulations!



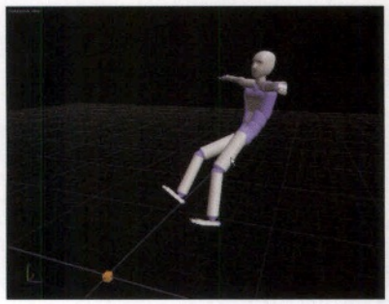
1 Once you've installed and run *endorphin*, you should find yourself looking at the software interface with a character standing before you, ready for action. It's incredibly quick and easy to get results from *endorphin*, so let's crack on and try out some of the basic functions with forces and behaviours.



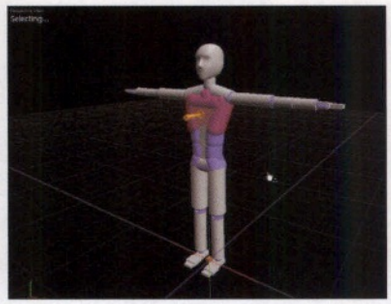
2 First of all, click the Simulate button on the Transport bar at the bottom right of the screen. Gravity should now kick in and the lifeless character will bend and fall to the floor. We'll start by adding a simple behaviour that will keep him upright for longer and provide a slight pause. To do this, right click on the Timeline next to where it says Character01.



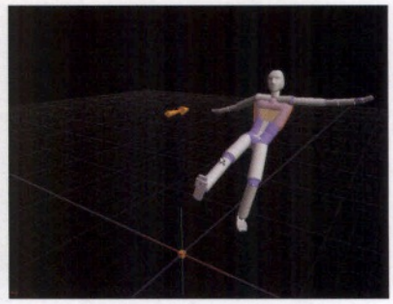
3 From the list of options, select Create Behaviour. An orange block will appear, labelled Arms Windmill 2.0, with numbers to either side. The numbers are the animation frames between which this behaviour occurs, and the text describes exactly what the character will do. Hit the Simulate button again to see the effect.



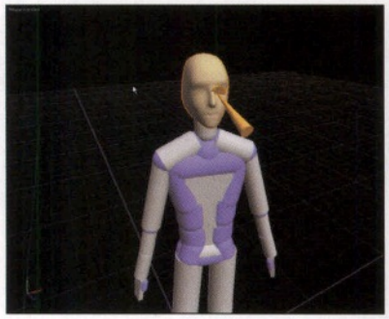
4 The result is vaguely amusing, but it's not what we're looking for here, so select the Behaviour block. On the Property View panel to the right, click where it says Arms Windmill 2.0 and change it to Stagger 2.0. Now make sure the Behaviour Block is starting at frame 0 (just drag it across if need be) and extend it to finish at frame 200. Now press Simulate.



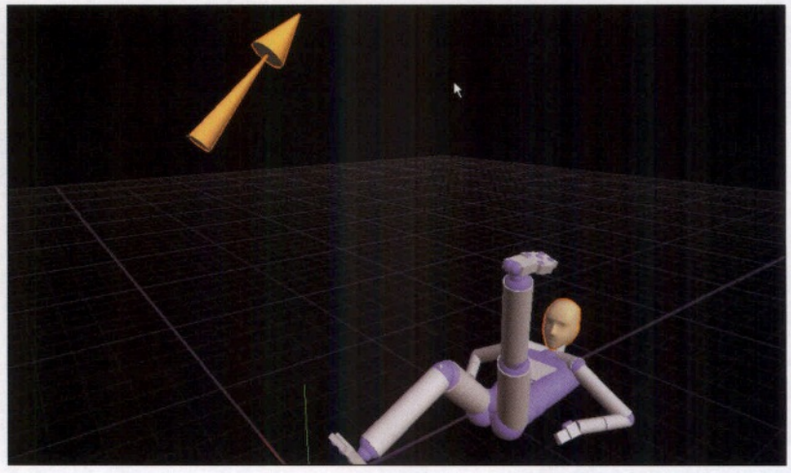
5 Our character now drops his arms to a more natural pose and wobbles a bit before tottering off to one side. That's great, so now let's hit him! Right click on the Timeline again, but use the next bar down to keep things clear and select Create Force. An orange triangle will appear on the timeline, along with a 3D arrow, protruding from our character's chest.



6 Drag the Force Event triangle to frame 80 and hit Simulate. You should see that the character now takes a knock to the chest which pushes him backward. The stagger behaviour that previously caused him to lurch to one side now adapts and tries to keep him upright as he moves backwards. Note that no keyframing is needed to achieve this effect.



7 Let's play with the force a little. First of all, we'll push it up. Either select Scale from the Toolbar and enlarge the arrow, or, for more precision, drag the Strength spinner in the Properties panel. Let's give it a value of 15. Now we'll change the angle of impact. Select Rotate and Move from the toolbar and position the arrow as shown in the screenshot above.



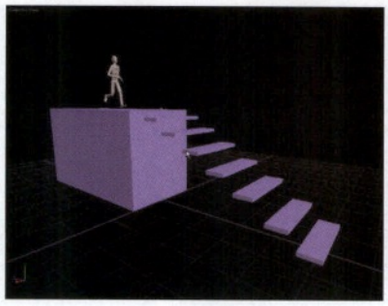
8 Finally, we'll change the body part that receives the force. With the force arrow still selected, click the orange Select link in the Properties panel and click on the character's head. If you wanted to, you could hold Ctrl down and select multiple body parts to affect. This would also amplify the force. Finally, hit Simulate and try not to laugh too much...

Part 2: Importing motion data

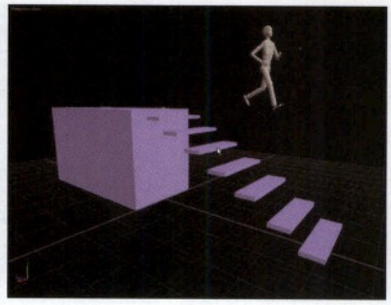
Combining motion capture with *endorphin's* simulation power has spectacular consequences...

Going further

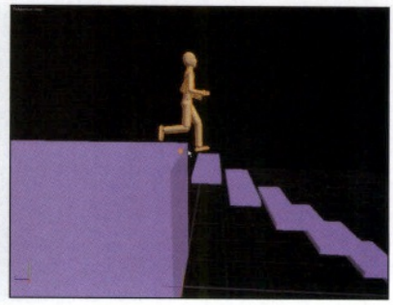
Endorphin is packed with far more features than we can possibly cover here. Other major techniques include using multiple characters to create body-contact footage, extra dynamic objects that can be strapped on to a character's body to change its proportions or to simulate bulky armour, and a simple yet powerful pose-to-pose animation system that produces staggering motion data when combined with dynamic simulation. There are also plenty of subtle functions that unfold as you use the package. For details, see the accompanying tutorials on the CD.



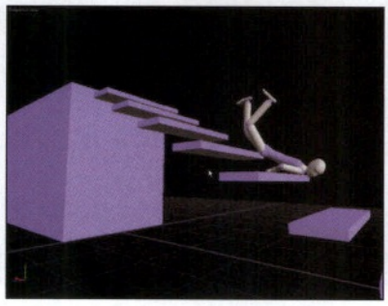
1 Having mastered the basics, we'll put theory into practice and take the effect a little further. Load the file Part2Start.ens from the disc. It contains a roughly modelled platform with some steps. There's also an *endorphin* character in a T-stance at the top. If you press the Simulate button now, you'll see that he has some motion capture applied.



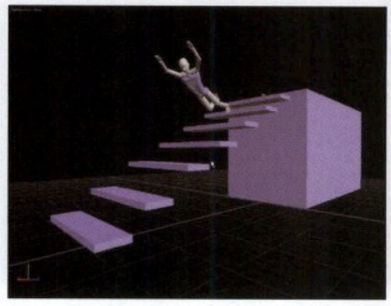
2 The motion-capture data is a simple jog animation that controls the stuntman's movements rigidly. In other words, he doesn't have any dynamic simulation interfering with the imported motion data. This is great while he's on top of the platform, but a little odd when he starts jogging in the air like Wile E. Coyote!



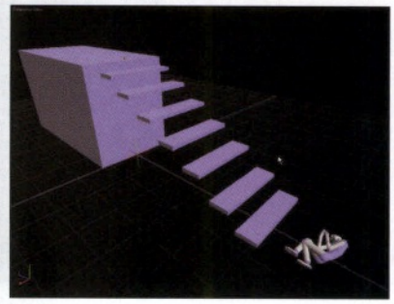
3 Let's bring him crashing down to earth. Scrub the timeline to the point when his foot is over the first step: frame 84 is good. Now right click on the timeline above the jog.fbx bar. Select Create Simulation Event and line it up to frame 84. This will override the motion capture at the selected point and start to perform the usual dynamic simulation.



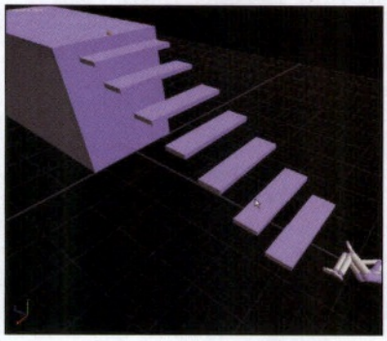
4 With a quick click of the Simulate button, you should see the horrific results. This simple combination of realistic motion-capture data and the most basic of *endorphin* simulations should demonstrate the sheer power of the package as a motion-synthesis tool. After all, how many real stuntmen would be willing to do this for you?



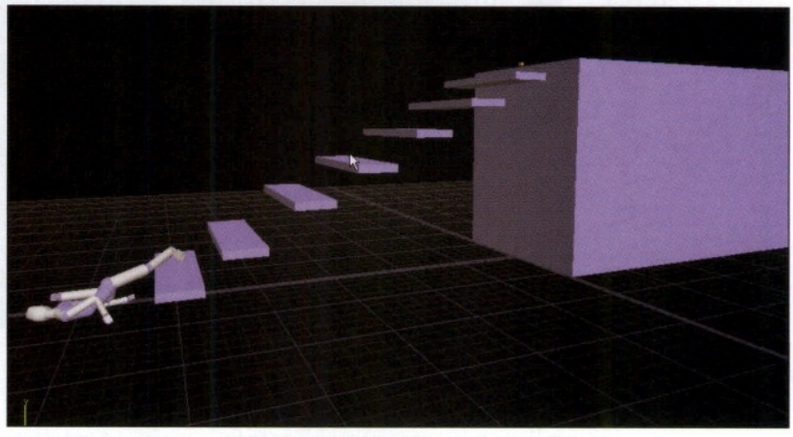
5 Of course, that's only the beginning. Now let's start adding behaviours. Below the jog.fbx bar on the timeline, right click and select Create Behaviour. Replace the default Arms Windmill 2.0 with Arms Raised Above Head 2.0. Set it to start at frame 84 and finish at about 150. Now run the simulation to see the difference a subtle move can make.



6 A single behaviour is nowhere near the limit of *endorphin's* possibilities, so let's carry on. Right click again next to the Arms Raised... behaviour and select Create Behaviour. This time, pick Body Foetal from the list. Set the start time to 150 and end to 200, then click on Simulate. You should see the character try to tuck up into a protective ball as he nears the bottom of the stairs.



7 Finally, we'll add one more behaviour. This time, pick Arms Wide of Head from the list and place it at the end of the animation, running between frames 190 and 250. Hit Simulate one last time and you should see that the character puts his arms out wide, causing the upper part of his torso to turn over to a rest pose.



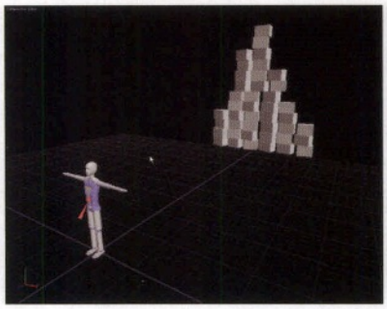
8 By now you should be getting an idea of how subtle yet powerful *endorphin* is. By layering motions of varying strengths, you can cause bodies to twist and turn, or simply go limp at various points in an already complex motion. Even better, we've done all this without needing to use any tiresome keyframing!

Part 3: Getting violent

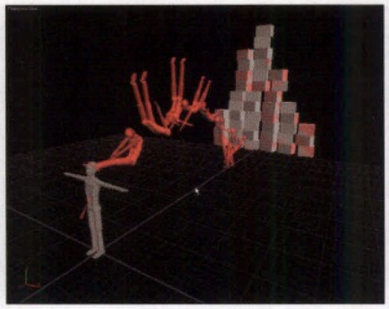
We can up the ante even more by getting objects to interact with our stuntman...

Asset repurposing

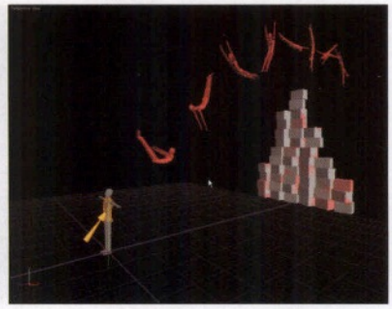
A much overlooked use for *endorphin* is its ability to revitalise existing mo-cap data. By applying some of its tricks to a stock move, you can quickly create dozens of variations on the initial theme. For example, you could add a catch motion or a fall to a standing pose, an impact to a fight sequence, or simply add an object to a walking character's arms to change the walk cycle into a carrying motion. Subtle variations can turn one mo-cap file into ten, and the possibilities are almost endless. *endorphin* lets you breathe new life into your old mo-cap data.



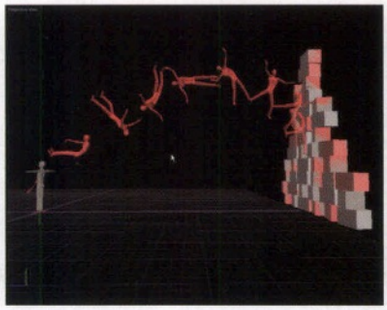
1 For the next part of this tutorial, we'll up the level of violence still further and try to perform a proper Hollywood-style stunt. To begin with, open the file Part3Start.ens from the CD. It contains our character, a force event and a very large stack of boxes...



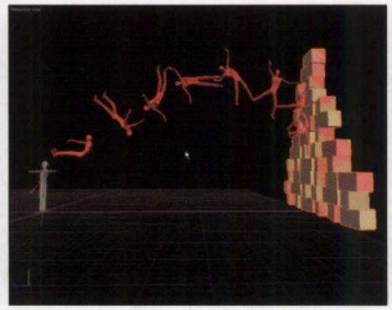
2 This calculation may take some fine tuning, so run the Simulation and then turn up the Strobe Range spinner at the bottom of the viewport to about 200. You should see a series of red ghosted characters appearing. This is an interactive display of the coming animation that provides instant feedback on all our future adjustments.



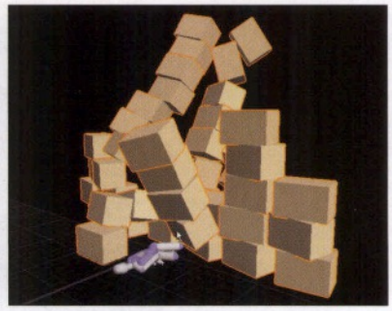
3 You should first notice that the character doesn't quite reach the boxes, so we'll start there. Select the Force arrow and, in the Properties panel, change the Strength to 50. The Strobe view will update and show you that this is far too hard. A strength of 36 should make the character land exactly where we want him to: just above the middle of the boxes.



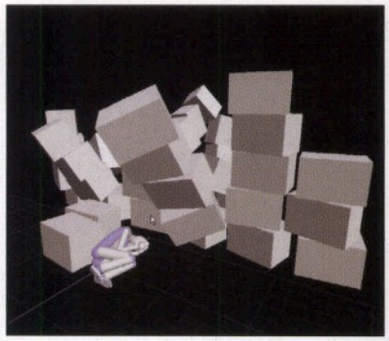
4 We don't want him to be completely lifeless, so let's add some behaviours. Right click in the Character timeline and select Create Behaviour. First choose Writhe In Mid-Air 2.0, crank its strength up to 1 and set it to run from 50 to 130. Now add a Fall Back, Twist And Catch Fall to run from 130 to 200.



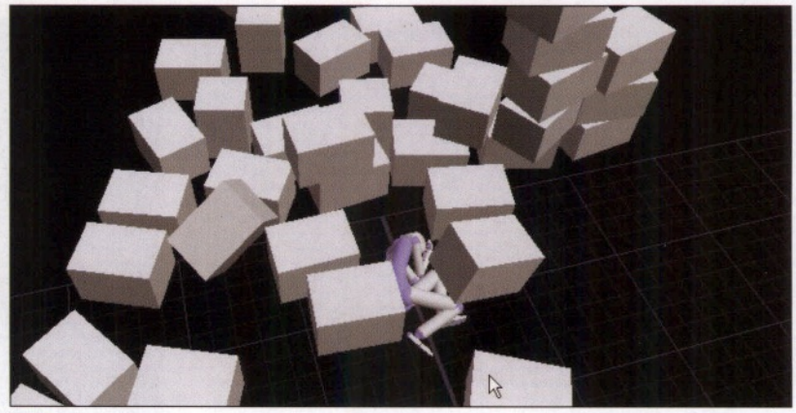
5 The wall is currently a solid object. This is because I've disabled it using a Simulation Event (the triangle on the Environment timeline). By applying these Events to objects or characters, you can simply turn them off from the simulation or, as in this case, allow other objects to bounce off them without causing them to fall themselves.



6 It's time to turn the boxes back on, but first take the Strobe back to 0 or the calculations will slow it down too much. On the Environment timeline, right click and select Create Simulation Event. The default property is Full Simulation, which will start up the dynamic solving on the boxes again. Make it start just at the point of impact (try frame 120) and hit Simulate.



7 The character should react as the boxes crash down around him, so right click the Character timeline and add a Body Foetal behaviour. Start it at about frame 280, just as he realises that the boxes are going to fall on him. It shouldn't matter too much where you stop it because this is his final movement and he'll retain that shape.



8 We could add some force damage to the poor guy as the boxes bounce off him, but I think he's suffered enough for today. By now you should have mastered the essentials of *endorphin*, which means it's time for you to experiment for yourself. In the final section of this tutorial, we'll show you a particularly stunning stunt. Your challenge will be to get the virtual stuntman to recreate it...

Part 4: Thinking bigger

Our final exercise looks spectacular, but it's pretty basic stuff for *endorphin*...

1 The scene we'd like you to try to emulate is slightly more advanced. It's certainly nowhere near the limits of what *endorphin* can do – there's still only one character and no data retargeting – but it's a good example of what can be achieved with a minimum of fuss.

To begin with, let's run over the scene. It's all made with basic *endorphin* collision objects, scaled and positioned to provide a dummy environment to bounce off until the data reaches a 3D package. For the stuntman, I used a simple jump and dive behaviour to get him moving, bolstered by a minor kick to his behind for some extra distance in his leap.

Bar some behaviours to provide body motion, the rest is pretty much *endorphin* doing its thing... that is, until near the end, when I applied a restraint to his right hand so that he could catch the last awning in the hope of salvation. His hold doesn't last, however, and he falls to the ground, only to receive a large kick from the car marker. This sends him flying into even more stacked-up boxes.

The start file (MassiveStuntStart.ens) is on the CD, so try recreating this scene. If you get stuck, load the final stunt (MassiveStuntFinish.ens) to study the necessary settings. ■

[image] Benjamin Smith [w] www.redstarstudio.co.uk

Boulder dash

All the resources needed to follow this tutorial can be found on the CD, in the Tutorial files\ Boulder dash folder

Discover how to blend live-action video footage with CG to create an animated sequence Indiana Jones would be proud of. By **Benjamin Smith**

You know what it's like. You pop out to the local milliners to arm yourself with a stylish new piece of headgear, and, on the way home you decide to take the short cut. You know, the one past the ruined temple? Before you can say "ancient Inca curse", you're being harried back to the office by a humongous sphere of rolling rock that flattens everything in its path – not least the shiny new hat you've just spent your hard-earned cash on. Bloody Incas – they must have something against hats.

While death-defying stunts like this are, admittedly, fairly rare in real life, attempts to reproduce the illusion with computer graphics are more popular, and slightly safer. To this end, we invite you to take a stab at the effect using the popular combination of *LightWave 3D* and *After Effects*.

This is a reasonably straightforward project, with regard to both the 3D and 2D elements involved, and so it's a good starting point for anyone who's new to the process of incorporating CG elements into live-action, moving backgrounds.

Over the four pages of this tutorial we'll be using some basic measurements taken from the location shoot to build a simplistic 3D model of the alleyway. We'll then line up a camera in *LightWave* so that we can add the ball and animate it, so it can roll down the alley with dramatic timing. We'll then render passes for both the ball and the shadow it casts on the ground.

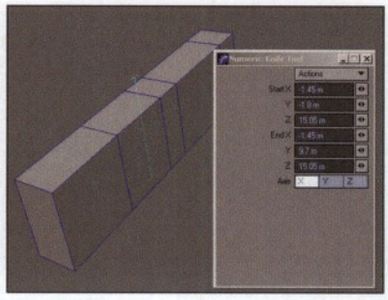
like a rolling stone

While simpler techniques would achieve the shadow merely by darkening the footage (sometimes within *LightWave* itself), here we'll use the rendered shadow information to do the darkening in *After Effects*, so that we can get the same quality in the shadows as you can see in the footage. It's generally easier to tweak the look of details such as this in a composite, and it saves you from potentially re-rendering the time-consuming 3D renders.

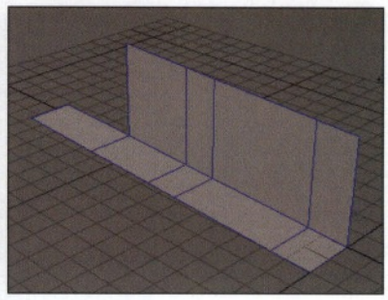
Part 1: Start the ball rolling

Model the alleyway from the location footage, and add the boulder to the sequence...

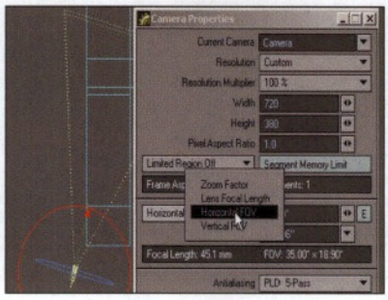
1 Open Layout, and, in the image editor load the background_plate image sequence we've included on the CD. Set the camera resolution to 720x380 pixels, and make the images the background in the Compositing tab of the Effects panel. In the Display panel, set Camera View Background to Background Image.



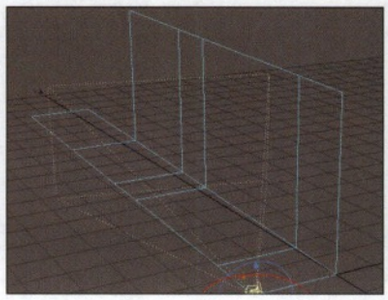
2 Load Modeler, and, working from the reference images, drag out a box in the rear view that's 4.1m wide, over 8m tall and 20 metres long. One corner of the box should be at the origin, so you can use the Knife tool from the numeric panel (press N) to knife-in divisions corresponding to the distances we've drawn in the images.



3 The alleyway is also sloping, although we couldn't measure this precisely on the shoot. For simplicity's sake, shear the model by 1m and then delete all the polygons except for the floor and the right wall. Save and load this model in Layout, setting it to Wireframe mode in the Scene Editor.

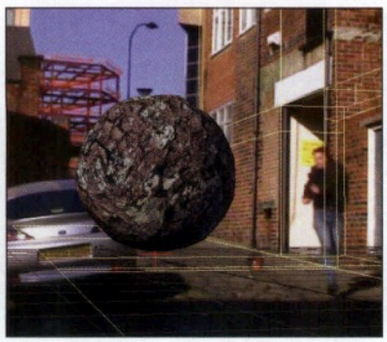


4 We took measurements from the camera to record the lens angle, so convert the Zoom Factor pop-up on the Camera Properties panel to Horizontal FOV and enter a value of 35 degrees. Now all you have to do is move and rotate the camera to line the Wireframe alleyway up with the background plate.

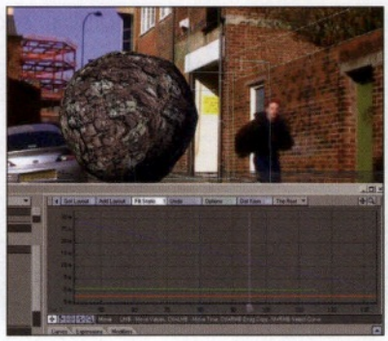


5 Set the camera's Y position to 1.3m, which is a rough tripod height off the floor. Position the camera just outside the set in its bottom-left corner, and tweak the position to get a good line-up.

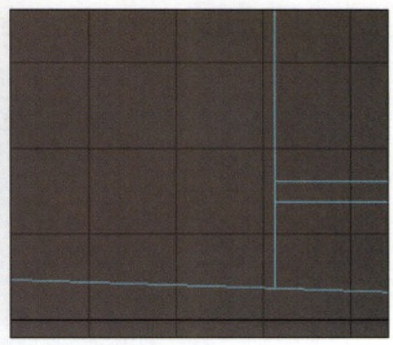
6 When you're happy with the line-up, you can do some extra knifing in Modeler and Smooth Shift in the recessed doorway you can see, as well as the top of the wall on the right of frame. You'll need this extra detail to accurately cast a shadow later on.



7 Add a null, name it ball_position, and, at frame 0, position it right at the top of the slope. Now add another null called ball_v001.lwo and parent that to ball_position. Load ball.lwo, which is provided on the cover disc and which is already textured. Parent it to ball_lift and then scale the ball so you get something that almost fills the alleyway. Now move ball_lift in Y as appropriate.



8 On frame 100, keyframe ball_position down to the bottom of the slope and, in the Graph Editor, set the Pre and Post Behaviours for the Position curves to Linear. Now you can select and drag the keys at frames 0 and 100 to adjust the timing on the ball's animation so that it follows the intrepid explorer down the alley and just misses him by a matter of inches.



9 Add another null called ball_turn and parent it between ball_lift and the ball itself. Animate the Pitch channel of this null to simulate the effect of the ball rolling downhill. Add a key at frame 100 and slide the Pitch value up and down in the Graph Editor until the rolling movement looks right.

›

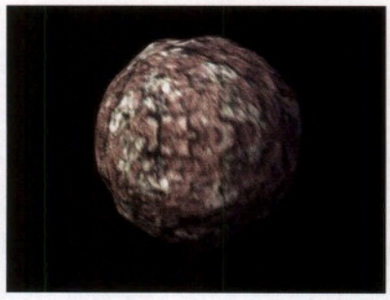
Part 2: Setting up the lighting

Configure a set-up that will light the ball and cast realistic shadows...

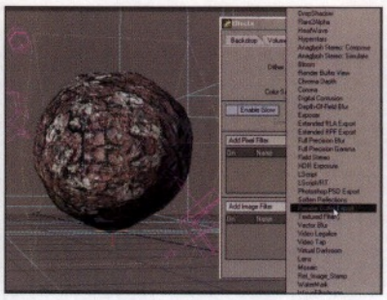
1 *LightWave* will have already created a default Distant Light, so turn on Raytraced Shadows in the Render panel and rotate the light to match the direction of the shadows in the background plate. If you set the surface on the alleyway so that it's 50% transparent, you can compare both the ball's rendered shadow and the shadows in the plate.

2 From the Global Illumination panel, set Ambient Light to 0%. Add a new Distant Light and rotate it to fill in the right side of the ball so it isn't in total darkness. It might help to make the fill lights slightly cool. Try a value of 191, 210, 255, and set the key light to a slightly warm colour, such as 255, 249, 235.

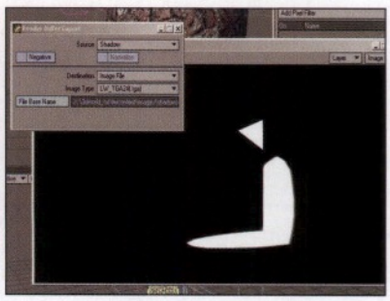
3 You might want two fill lights so that some of the light gets underneath the ball. You can also add a rim light behind the ball, giving a rim of light along its edge. You should now adjust the brightness of the various lights so that the ball's lighting looks appropriate for the background plate.



4 Now you can render a beauty pass of the ball. Set the background to black, turn on Motion Blur in the render panel and deactivate the alleyway (turn off the tick in the Scene Editor). Render out an image sequence of your animation, remembering to use a 32-bit saver (such as LW_TGA32) to save the Alpha channel.



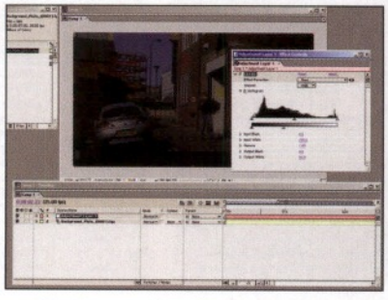
5 To render the shadow pass, turn the alleyway back on, set the ball to Unseen By Camera from the Render tab on its Object Panel and turn off the fill and rim lights, again with their Scene Editor tick. In the Effects panel, add the Render Buffer Export plug-in as an Image Filter and double-click it to open its panel.



6 Set Source to Shadow and Image Type to TGA24. Set a filename and a destination and then, before you render, turn off the RGB Output in the Render Panel, otherwise *LightWave* will save over the last render. An F10 render will throw up an error message but ignore it. Check a rendered image to see the white-on-black shadow.

Part 3: Compositing in After Effects

Edit the rendered shadows so they match the real ones in the footage...



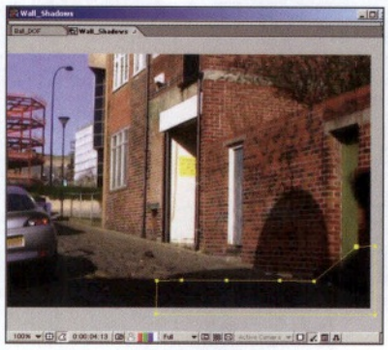
1 Create a new *After Effects* Composition that's 7 seconds long at 720x380, making sure to use Square Pixels and 25 frames per second. Add the Background_Plate image sequence to it, then create an adjustment layer on top of it. Add a Levels effect and tweak the Output White setting to quickly darken the image.

2 You can now use your rendered shadow pass to drive this adjustment, so import the pass above the Adjustment layer and change the TrkMat to use the Luma from the render. Move to 4 seconds on the timeline and you'll see a shadow on the wall and floor. The task now is to make this shadow match the shadows you can already see.

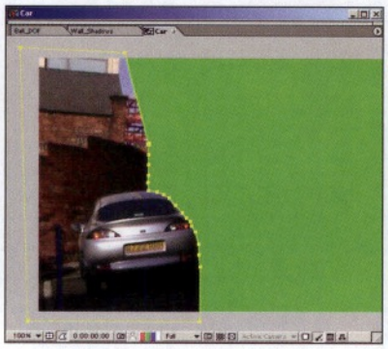
3 Apply a Gaussian Blur effect to Wall_Shadows and set it to about 2 to blur them to match the plate. Now move forwards to 4.5 seconds and you'll see that where the rendered shadow crosses a real shadow, you get doubly dark shadows. You'll have to mask this out, so select the Shadows Layer and activate the Pen Tool.

Compositing in After Effects, continued

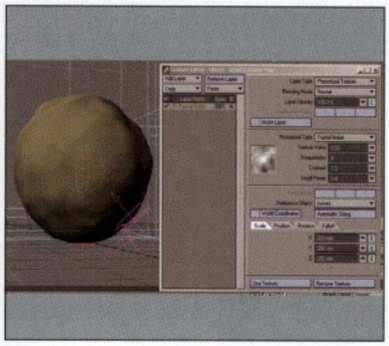
Mask-out elements in the footage, and apply a few final tweaks



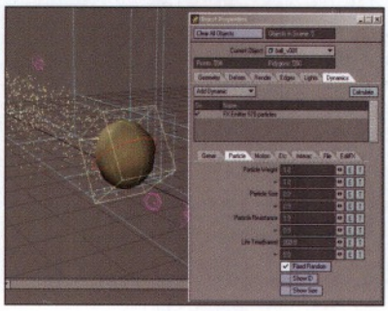
4 Change the Mask mode to Subtract, and draw a mask on the composition to match the area of the big shadow at the bottom-right; it doesn't have to be too accurate because it's only visible for a few frames. You can also set Feathering to around 3 to blur it, so that it roughly matches the softness of the real shadow.



5 Clearly, we're also going to need to mask-out the car and foreground wall elements that the ball has to pass behind. Add the background plate to the top of the composition again and use the Pen Tool to draw around the car and the wall, using a feathering value of 1 to get a slightly soft edge.



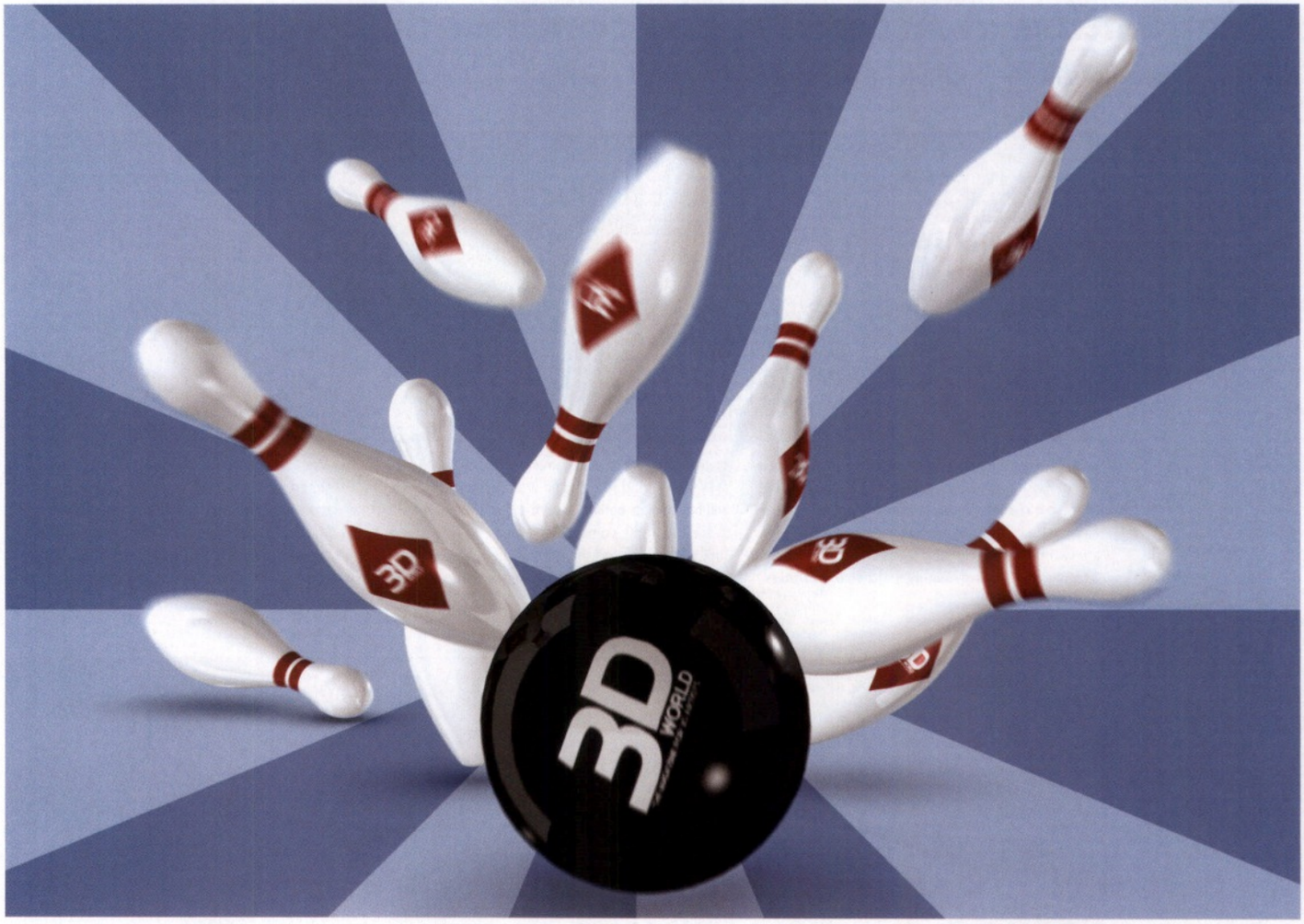
6 We used a displacement map on the rock ball when we rendered the passes on the cover CD, which means it isn't perfectly round. Add one from the Object Properties panel, make it a Fractal Noise procedural and experiment with the settings until you get something that's subtle, but also realistic.



7 Add a PFX emitter to the ball object in *LightWave* so that it spawns particles as it rolls along. You can then apply HyperVoxels to the particles and render them in the Sprite mode, with the floor and the ball set to be black. This enables you to create a column of dust that looks like it's being kicked up from the floor by the passing ball.

8 You could even model a little 3D hat in *LightWave*, and position it to match the hat once it's on the floor. When the ball passes over, the hat could be flipped up in the air by the rush of air moving past. To do this, use the Front projection texture to stick the texture from the plate on the hat.

9 In your final *After Effects* composition, you can not only composite in these extras, you can also tweak the look of what you've got considerably. Experiment with trying to key-out the sky in the footage, blur it and re-composite it over the ball so that the blue of the sky seems to lap around the ball slightly. You can also add grain and noise into the ball, and ever so slightly into its shadow, to get it to match the grain from the DV on the background video better. If you aren't editing the shot among other shots, you can also colour-correct or 'grade' the shot to make it look more interesting – perhaps with a desaturated yellow tint to make it look more like an Aztec desert and less like an alleyway in Sheffield. You can find some of these tweaks in the *After Effects* file final_shot_extra.aep on the CD. ■



[Illustration] Ola Madsen [w] www.digitalcontext.se

Bullet-time animation

All the resources needed to follow this tutorial can be found on the CD, in the Tutorials files\ Bullet-time animation folder

Ola Madsen shows you how to create an animated bowling alley sequence, complete with freeze-frame effect at the moment of impact, using *XSI*

The basic principle of ten-pin bowling is simple: throw a big, heavy ball down a highly polished wooden floor, and keep your fingers crossed that it will knock over at least one of the odd-shaped thingies at the end of the lane. But while the game itself may be straightforward, animating it is not – particularly if you want to freeze time temporarily for a *Matrix*-style 'bullet-time' sequence as the ball strikes the pins, as shown in the movie on the CD.

Even though there are only 11 objects in the scene (the ball and ten pins), it would still be an extremely tedious task animating them all by hand, due to the way in which they're supposed to interact with each other. Unless you need the pins to follow truly extraordinary trajectories (which can be achieved by additional keyframe animation), *XSI*'s rigid body dynamics (RBD) will the best option to choose.

Softimage units

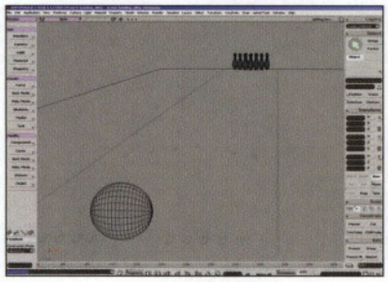
Consequently, we'll be facing the recurring question about scale and Softimage units. The truth is that a Softimage unit equals exactly anything you want it to. Whether this is an inch, a centimetre or a mile is arbitrary, and won't make a difference as long as you know what it's representing in your current environment. However, in order for the values used in the simulation to make any sense at all, it's important to note that, by default, they're based on the rule that one unit equals ten centimetres.

The second part of the solution requires a touch of further manipulation, which will take place in the Animation Mixer. While we could animate the change of time/speed in the movie by hand, as we're simulating the movements of the pins with RBD, this would leave us with a major problem. Decreasing the forces and the speed of the ball could indeed give the desired impression of slow motion, but would also change the way in which the objects interact. For instance, if we reduce the speed of the ball below a certain limit, it won't have enough energy to knock down any of the pins.

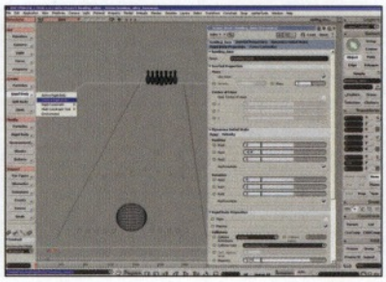
Instead, we'll run the simulation at full speed, and cache the position and orientation of each object at every frame as a clip in the Animation Mixer. Once this is done, we can easily animate the speed of the clip (a feature known as a 'time warp'), and have full control of the camera motion.

Part 1: Setting up the alley

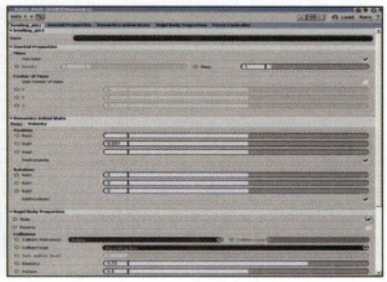
Start by configuring the properties for the bowling ball and pins...



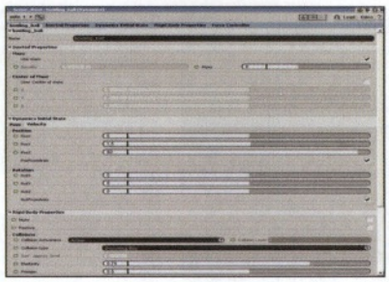
1 Start by loading the scene file 'bowling_alley.scn' from the CD; apart from the refreshments, the scene contains all the necessary ingredients for a successful night of bowling. The first thing we need to do is set up the physical rules, which are going to control the interactions between the scene's components.



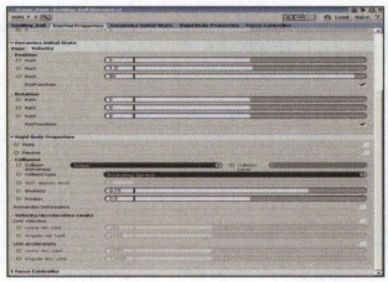
2 Press 4 to switch to the Simulate toolbar. The bowling lane itself shouldn't be affected by the dynamics in the scene (such as the Gravity), so for this reason we'll turn it into a passive rigid body. This is done by selecting the Lane object and choosing Passive Rigid Body from the Create > Rigid Body menu. Leave the default settings as they are, and close the PPG.



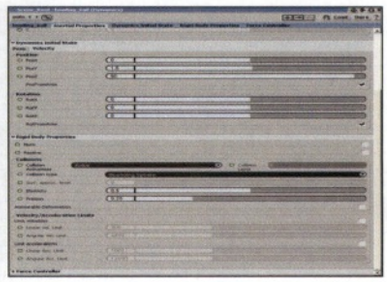
3 Both the ball and the pins should act and react with each other. Select all of them (11 objects in total) and, from the Create > Rigid Body menu, choose Active Rigid Body. We'll be working on the settings separately, so to ensure optimal interaction, check the Mute checkbox to temporarily exclude them from the simulation. Close the PPG.



4 Select the ball on its own. From the Modify > Rigid Body menu, click Edit Rigid Body to open its PPG. Bowling regulations prohibit balls from weighing more than 7.26kg, and having a circumference greater that 68.6cm. Under the Inertial Properties, enter 6 as the Mass and we'll stay well under the limit. You can always return and change any of these values later on to fine-tune or experiment with the outcome.



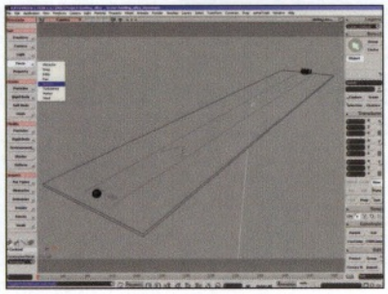
5 Scroll down to the Rigid Body Properties and uncheck the Mute checkbox. By default, the collision type is set to Bounding Box, which won't produce very realistic results for our ball. Change the type to Bounding Sphere instead. In the next step, we'll set how and when the ball will start losing its energy.



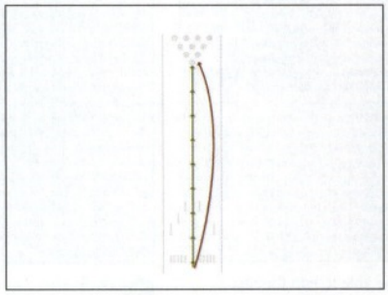
6 Elasticity determines how much of the energy will be lost or gained when the ball collides with another object, while Friction determines how much will be lost as it rolls along the surface of the lane. Set the Elasticity to about 0.5 and the Friction to 0.25. These parameter values are obviously affected by those assigned to the other objects in the simulation, so you may wish to go back and fine-tune them later on.

Part 2: Preparing the hook

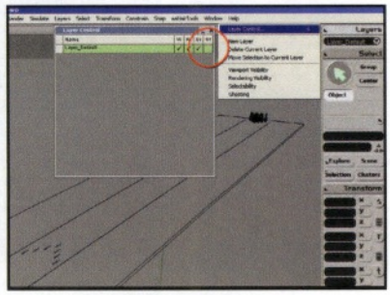
Introduce gravity to the proceedings, and enable *XSI's* Ghosting feature...



1 Before we start working with motions, we'll need to add Gravity. Any force added to the scene is automatically assigned to all RBD objects in the environment. From the Get > Force menu, click Gravity. As we've constructed our objects in the 'correct' scale (see the introductory text), we can just leave the Amplitude settings as they are.



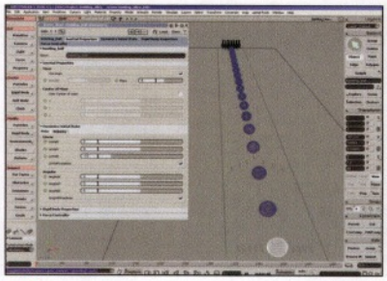
2 Due to the layout of the pins, it's impossible to knock all of them down with the ball alone – you have to rely on the pins hitting each other. Most inexperienced bowlers throw the ball in a straight line, aiming directly at the first pin, whereas the more experienced player will have usually developed a 'hook' or curved trajectory, as shown above.



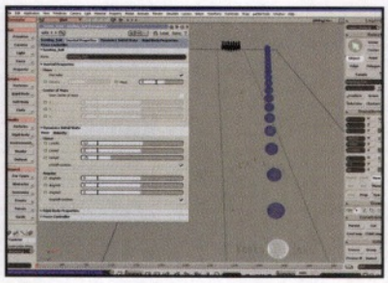
3 A useful feature in *XSI* is the ability to use Ghosting, which is available even when working with RBD simulations. Press 6 to open the Layer Control Window and click the empty checkbox at the far-right to activate Ghosting for all objects in the layer. This enables us to see the position of the ball throughout its animation without actually running the simulation.

Part 2: Preparing the hook, continued

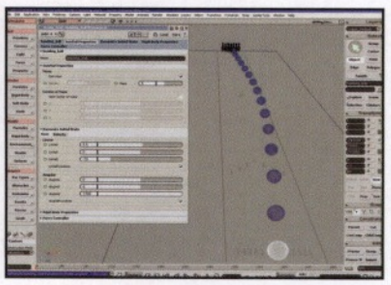
Set the speed and trajectory of the ball, and the motion values for the pins



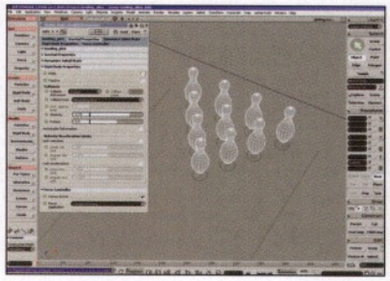
4 Return to the Dynamics PPG of the ball. Under the Dynamics Initial State, click the Velocity tab. Since there's currently no animation assigned to the ball, we need to provide some initial energy. Enter –70 as the LinVelZ. With some quick mental calculation, you'll see that a value of 70 means the ball will travel just over 25km per hour, as 70 units equals 7 metres (a second) times 3,600 seconds.



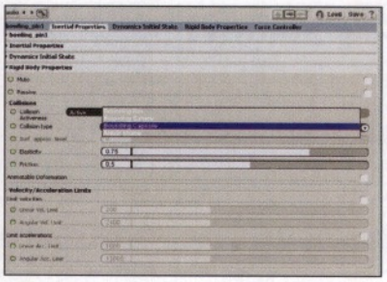
5 To achieve the curved path we're striving for, we'll also need to throw the ball at a slight angle, rather than straight down the lane. Set the LinVelX to about 5.5. Now the ball obviously runs way out of bounds. To fix this, we'll need to make it spin, thereby forcing it back towards the pins as it travels down the lane.



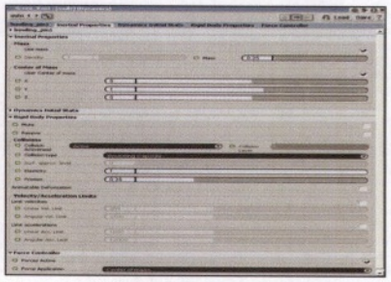
6 The amount of spin required depends on the values assigned to LinVelX and LinVelZ. The plan is to make the ball hit the pins between pins one and three, assuming that you're aiming for a strike. Under the Angular settings, enter about 1350 as the AngVelZ value, which should do the job nicely. Play with the setting until you're happy with the shape of the path.



7 Before you start working with the parameters for the pins, you should turn off the Ghosting, because this can slow down the system considerably. Select all ten pins and, from the Modify > Rigid Body menu, click Edit Rigid Body. They are still excluded from the simulation, so start by unchecking the Mute checkbox under the Rigid Body Properties.



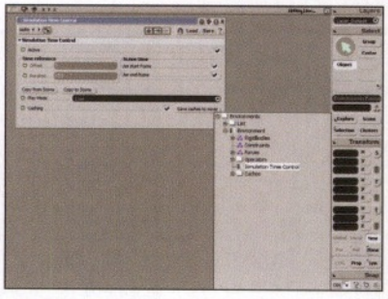
8 The Bounding Box collision type won't work very well once the pins fall over, so let's change its Bounding Capsule. Although there's an Actual Shape available as the collision type, you'll run a great risk of getting an unpredictable result, and even stability issues, when using it (in *XSI* version 4.2). As such, unless it's truly needed, we would recommend that you don't use it.



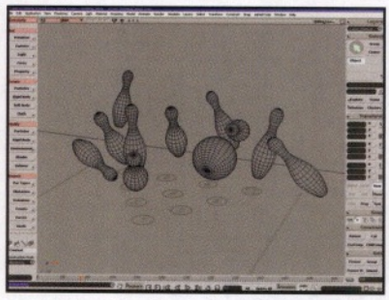
9 A high Elasticity value, such as 1 (above 1 will add energy at each collision) will give you lots of bouncing, whereas a low value will bring the pins to rest quickly. Set the Elasticity to 1 and the Friction to 0.25. To add more character to the motion of the pins, set the Mass (under Inertial Properties) to about 0.25, click the Use Centre of Mass checkbox and set Y to about 1.

Part 3: Caching the simulation

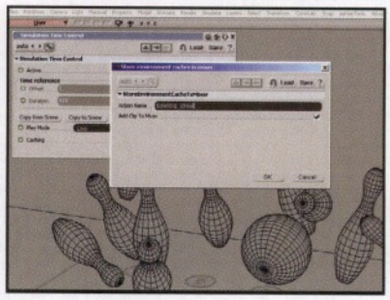
Run the clip, and load it into the Animation Mixer...



1 In order for us to be able to edit the result of our simulation, we need to store the information about where and when the objects are in space and time. In the Main Command area, click the Explore button and choose Environments. Expand the Environment section and click the Simulation Time Control. Check the Caching checkbox at the bottom of the PPG.



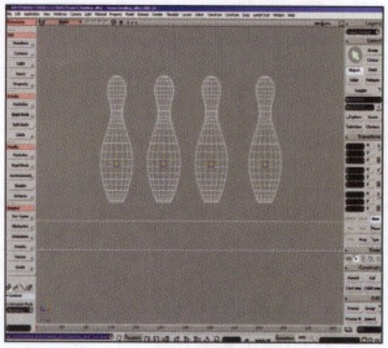
2 While all the action is played out in about four seconds (100 frames), we still want to run the simulation for another 15 seconds or so. The reason for this is to ensure that we'll have enough animation in our clip to allow easy editing. At frame one, hit the Play button, and let the simulation run all the way to the last frame (500).



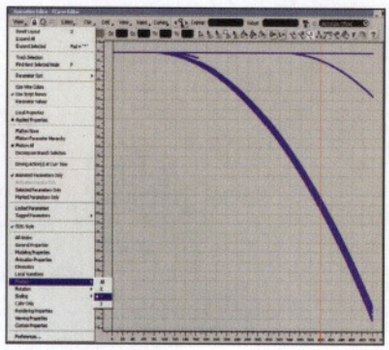
3 Return to the Simulation Time Control PPG and click the Save Caches to Mixer button. This will open a new PPG. Enter a suitable name for the clip and click the Add Clip To Mixer checkbox to load it into the Animation Mixer. Now click OK. Note that this will automatically deactivate the simulation and the motions will now be driven by the animation clip instead.

Part 4: Editing the animation clip

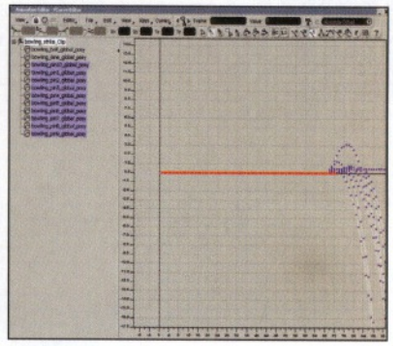
Edit the completed sequence to create the bullet-time effect...



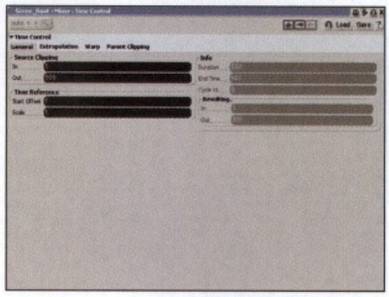
1 While the Bounding Capsule is working nicely with the pins, there is a slight problem. As the ends of the capsules are round and not flat, the pins appear to be floating in the air at the beginning of the simulation. Don't worry about this – since we've converted their positions to F-curves, we'll be able to fix this slight slip-up in the next two steps.



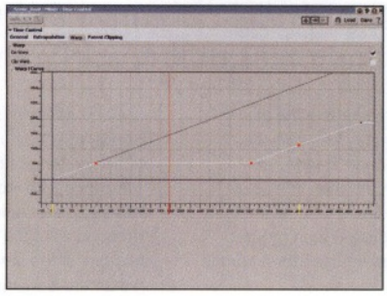
2 Select any of the objects and press Alt+0 (zero) to open the Animation Mixer. With the right mouse button, click on the simulation clip and choose Animation Editor (AE) from the menu. In the AE, click the View menu and choose Position > Y to filter out any animation (apart from what's on the object's Y-axis). In the Animation Tree, select all of the pin objects.



3 Zoom in really close on the frames between 1 and something like 60. Looking at the keys, you'll see that they have a value just over 0.4, whereas the bowling lane is at 0. Select all the corresponding keys for the pins, enter 0 in the Value text box and press Enter. It's a good idea to work with one pin at a time, as it's easier to see the different keys. Close the AE and you're back on track.

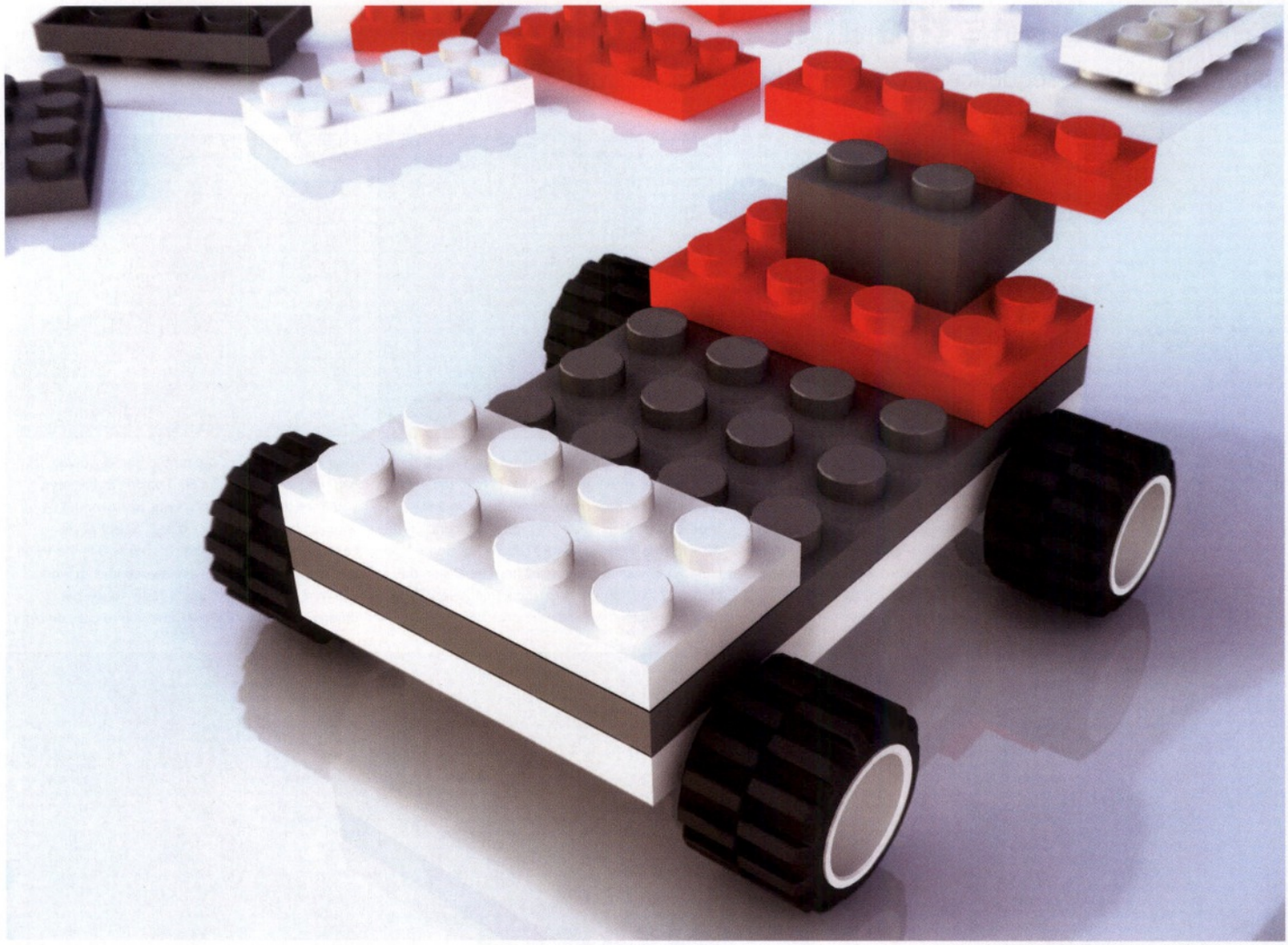


4 Select any of the objects, and press Alt+0 to open the Animation Mixer. Select the F-curve and use the right mouse button to click on the simulation clip. From the menu, choose Time Properties (or press Ctrl+T). In the General tab of the Time Control PPG, you have the option to scale the duration (speed) of the entire clip by changing the Scale value under the Time Reference.



5 Since we're going to animate the change of speed, we'll need to switch to the Warp tab. Start by clicking the Do Warp checkbox to enable the effect, right-click inside the Warp F-curve area and choose Keys > Unlock All Keys from the menu. Step through the animation until you reach the frame where you want the time warp to begin. This will probably be somewhere around frame 71.

6 Right-click within the graph again and choose Keys > Insert Key at Current Time. Next, go to frame 73 (this is the frame where you want the animation to return to normal speed) and insert another key. Set another key at frame 150. Now select the keys at frames 73 and 150 and move them about 250 frames to the right. (To avoid accidentally changing the Y values of the keys, you can right-click and choose Keys > Lock In Y (Value).) This will stretch the animation between the keys on frames 71 and 73 for another 10 seconds, but leaves the speed between the keys on frames 73 and 150 unchanged. Your graph should now look something like the line in the previous screenshot. And that's it. Your freeze-frame effect now should be complete. ■



[Illustration] Ola Madsen [w] www.digitalcontext.se

Realistic animation

All the resources needed to follow this tutorial can be found on the CD, in the Tutorial files\ Realistic animation folder

Ola Madsen shows you how to animate a model car convincingly, by using *XSI's* Rigid Body Dynamics to replicate the forces that propel a real one

Beneath the technical wizardry, the way in which a car works is fundamentally very simple. Energy generated by the engine is transferred to the wheels, which in turn, forces them to rotate. Due to the friction between the tyres and the ground, this rotation then drives the entire car forwards.

However, when rigging a model of a car for animation, 3D artists traditionally approach the problem the other way around. It would be far too complicated to derive the motion of the entire car from the rotation of the wheels; instead, hierarchies and/or constraints are used for the overall motion, while expressions are used to make the wheels rotate accordingly. But while this approach gets the job done, it isn't particularly intuitive. If the road surface is anything but perfectly flat, the components of the car fail to react to this vertical motion, adding metaphorical as well as literal bumps to the workflow.

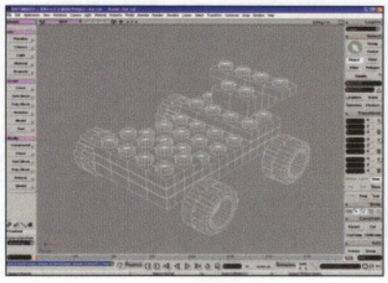
Making motors

Instead of going through the lengthy process of animating these different parts manually, we can make use of *XSI's* dynamics engine. By adding Rigid Body Dynamics (RBD) to the animation rig, we can recreate the same essential behaviour as a real car. In this tutorial, we'll be illustrating this technique on the toy car pictured above.

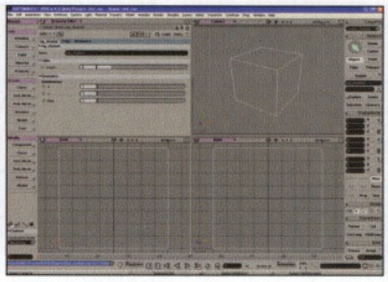
Working with simplified geometry enables you to interact intuitively with the components of the scene without losing the accuracy of the simulation, so we'll be using an animation rig made up of simple primitives to simulate the workings of its suspension. Creating a separate primitive rig eliminates any uncalled-for calculation and enables you to adjust elements such as the body or wheels later in production, more or less on the fly. In this way, one underlying rig can be used for many different cars.

Part 1: Making the car rig

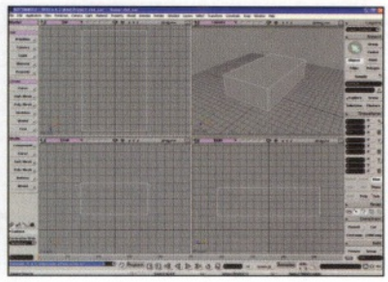
Create a simple chassis object and add suspension and wheels...



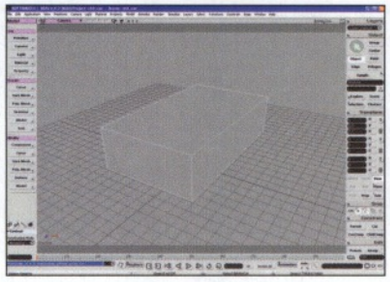
1 If you don't have a virtual car of your own, start by opening car.scn from the CD. While the scene may appear to be empty at first, opening an Explorer view shows that it contains all the essential components of a toy car, although they're currently hidden. We'll get to these later in the tutorial, so just leave them as they are for now.



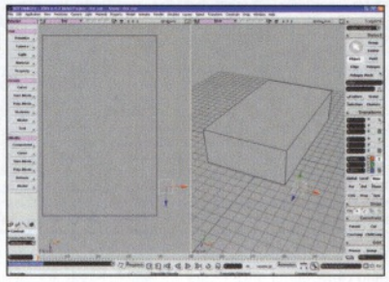
2 The first component to create for the rig is the chassis, or the stand-in for the body. As the exact shape of this object will be irrelevant to the eventual animation, there's no reason to use anything fancier than standard primitives. So, from the Get > Primitive > Polygon Mesh menu, choose Cube, leave the Length set to 8 and name it 'rig_chassis'.



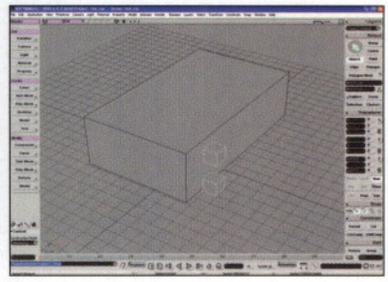
3 While the shape of the chassis might be accurate enough, we still want its overall width and length to match up with the high-resolution version of the car. Scale the cube down to 0.5 on the Y axis and up to 1.7 on the Z axis. Translate the cube upwards about 4 units along the Y axis so the chassis is slightly above the supposed ground plane.



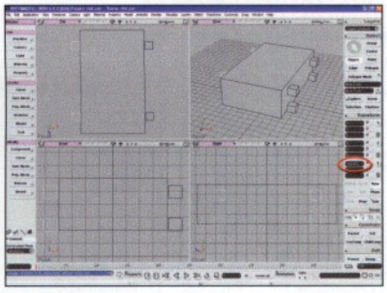
4 Although we've simplified the structure of the car quite drastically, there's really no reason for the driving experience to become unpleasant as a result. So, with your driver's comfort in mind, we're going to add suspension to the car. In order for this to function properly we'll need to create two new objects for each wheel.



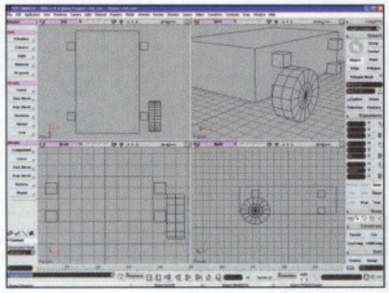
5 As these objects will be used merely to simulate the suspension effect for the wheels, their actual shape and size really won't matter. So from the Primitive > Polygon Mesh menu, create a new Cube and set the Length to 1. In the Top viewport, position the Cube just to the right of the chassis and roughly where the wheels are intended to sit on the Z axis.



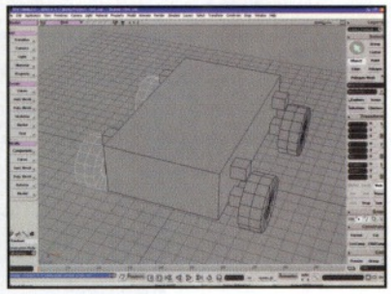
6 Next, in the Right viewport, move the Cube upwards so it's slightly below the top of the chassis. With the cube still selected, press Ctrl+Alt+D to create a duplicate, and translate it downwards so it aligns with the bottom of the chassis object. Pressing Alt, as opposed to just using Ctrl+D, ensures that the new copy stays at the same position as the original.



7 Select both suspension cubes, press Ctrl+Alt+D again and move the duplicates back along the Z axis to the rear of the car chassis (where the wheels will be positioned). Next, select all four cubes and duplicate them. Now add a minus in front of the value in the X axis transformation box (the SRT Text Box in the Transform panel) to reposition them on the opposite side of the car.



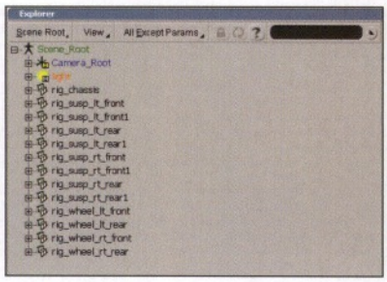
8 From the Primitive > Polygon Mesh menu, create a Cylinder and set the Radius to 2 and the Height to 1.5. While the level of subdivision won't make any difference to the accuracy of the simulation (since we won't be using the actual geometry for the calculation), it will give a better visual appearance. So increase the U Subdivisions to 15 or so, and name it 'rig_wheel'.



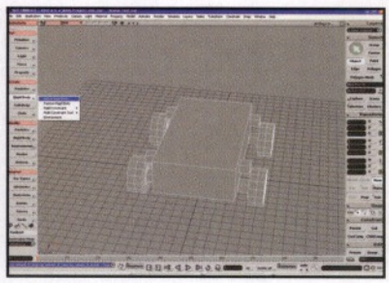
9 Rotate the wheel 90 degrees along the Z axis and align it to any of the lower suspension cubes. Next, create three duplicates and align one at each of the remaining suspension cubes. Go over the scene, and make sure none of the objects are interpenetrating, as this will create unpredictable results if we're to simulate collisions for them.

Part 2: Activating RBD for the rig

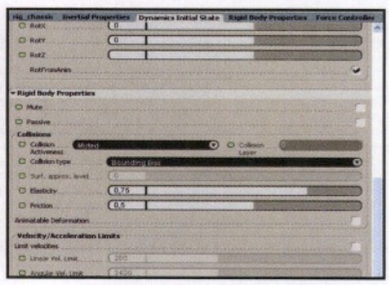
With the rig complete we need to add properties to the various components...



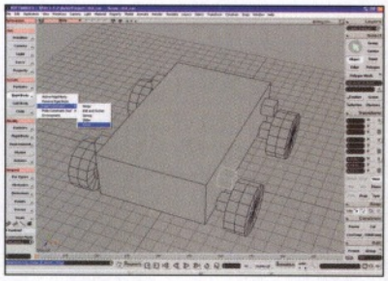
1 It's important to recognise some of the differences involved when animating with RBD compared to a more traditional line of attack. When using RBD, all the objects are being calculated in global space rather than local. As a result, all objects in the rig should be located directly under the scene root (or at least on the same level), and not be relying on standard hierarchies or joint relations.



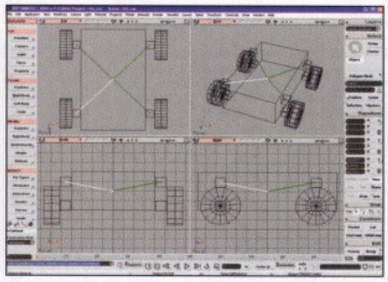
2 With the components of our rig completed, it's time to start adding their respective RBD properties. So, press 4 to switch to the Simulate panel. The first thing we'll need to do is to turn all the objects into active rigid body objects. To do so, select all the objects (there should be 13 in total), and from the Simulate > Create > Rigid Body menu choose Active Rigid Body.



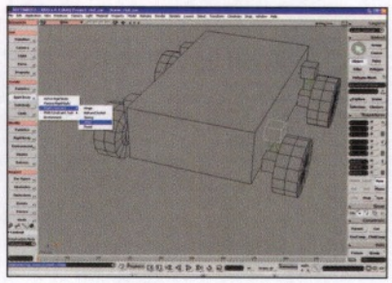
3 As you won't be using any actual collisions on our objects (apart from our wheels, which we'll come to in a moment) you may as well turn off their activeness. So in the Rigid Body Properties Editor, change the Collision Activeness to Muted, and make sure the Collision type is set to Bounding Box. You can leave the other parameters as they are for now.



4 To stick the different bits and pieces together we'll need to use Rigid Constraints rather than one of the usual Constraints. Since all the objects in the rig naturally should stick together in the end, we'll need to use three different types of constraints in order for the components to work in the preferred manner.



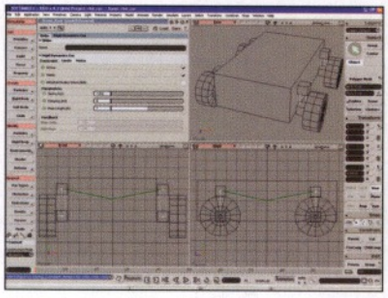
5 The only parts we really want to stick to the chassis are the upper suspension cubes. Start by selecting one of them, and from the Create > Rigid Body > Rigid Constraint menu, choose Fixed. Select the chassis object, and leave the parameters in the PPG as they are. Repeat for the other three upper suspension cubes.



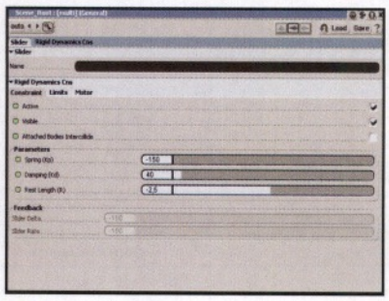
6 To create the suspension effect, select one of the upper suspension cubes, and from the Create > Rigid Body > Rigid Constraint menu choose Slider. Pick the lower cube related to the one you've got selected. We'll edit the parameters for all the sliders at once, so leave them for now. Repeat for the three remaining pairs of cubes.

Part 3: Creating the suspension

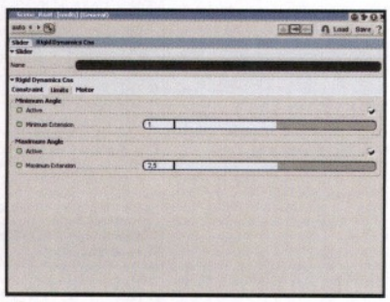
The Spring, Dampening and other values are the key to creating a realistic effect...



1 Select all four Slider Constraint objects, and press Enter to display their PPG. The Spring (Kp) parameter determines how fast each linkage will contract. However, we want the very opposite effect to take place, so to make it expand instead we'll need to use negative values. Enter about -150 as the Spring (Kp).



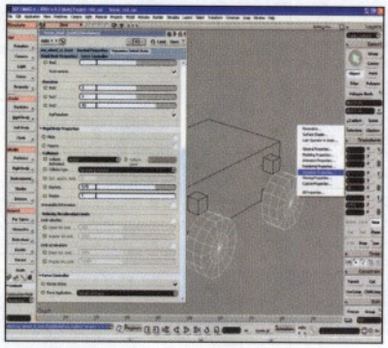
2 The default dampening effect is a bit too low, so increase the Dampening (Kd) to about 40. The Rest Length (R) is the Sliders' preferred length and should be set to about -2.5. Which values to use for the different parameters is really a matter of taste, so ultimately you should tweak them until they suit your specific needs.



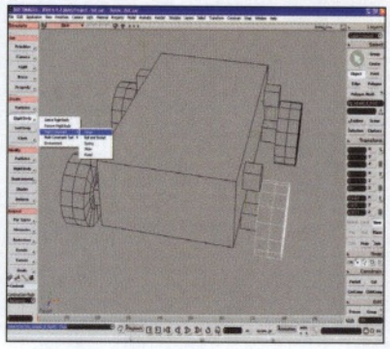
3 Next, we'll need to limit the minimum and maximum length of each Slider, so switch to the Limits tab. The Minimum Extension determines the minimum length the Slider is allowed to reach during the simulation, whereas Maximum Extension sets the maximum. Activate both, and set the Minimum to 1 and the Maximum to 2.5.

Part 4: Setting up the wheels

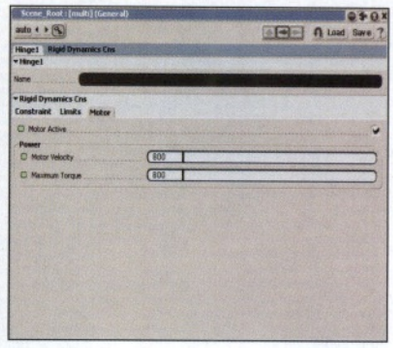
The final step is to configure the properties for the wheels...



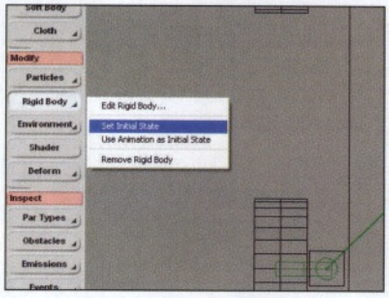
1 Select all four wheels, right-click on the Selection button in the Selection panel and choose Simulation Properties. Select the Rigid Body Properties in the PPG, and change the Collision Activeness to Active. As the wheels are round, we also need to change the Collision type to Bounding Sphere. Finally, increase the Friction to 1.



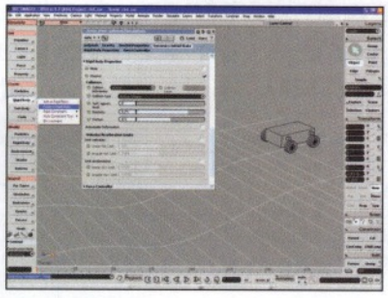
2 Select one of the wheel objects again, and from the Create > Rigid Body > Rigid Constraint menu choose Hinge, and select the corresponding lower suspension cube. The Hinge Constraint limits the movement of the wheel to revolving around a preferred axis, which is just what we're looking for. Repeat for the other three wheels.



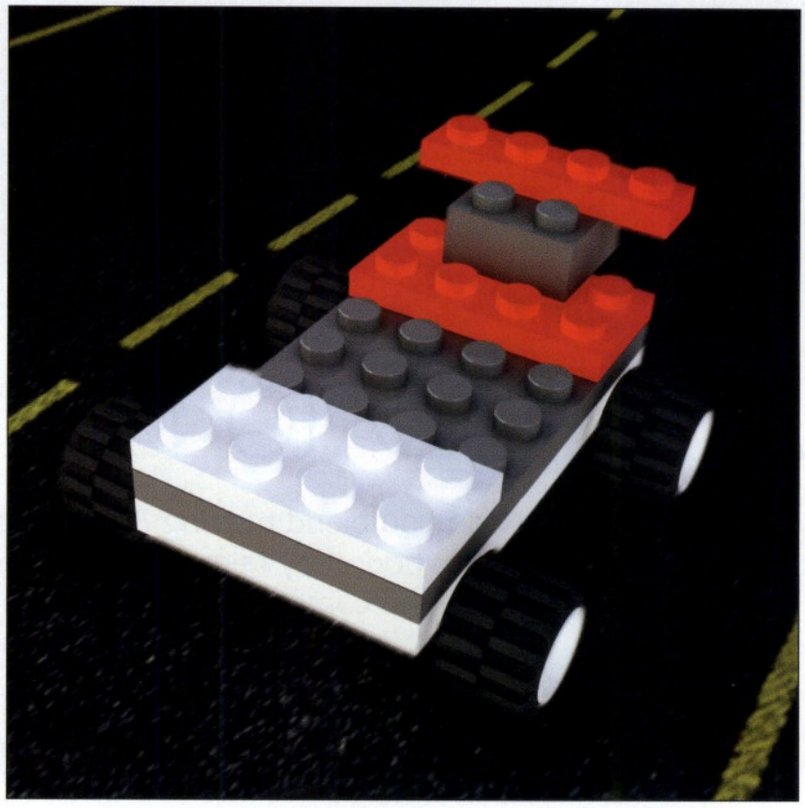
3 Select the two rear Hinge Constraint objects, and press Enter to display their PPG. Switch to the Motor tab and click the Motor Active checkbox. The Maximum Velocity determines the rate of the rotation, whereas the Torque determines the maximum amount of force to be transferred. Set both the Velocity and the Torque to around 800.



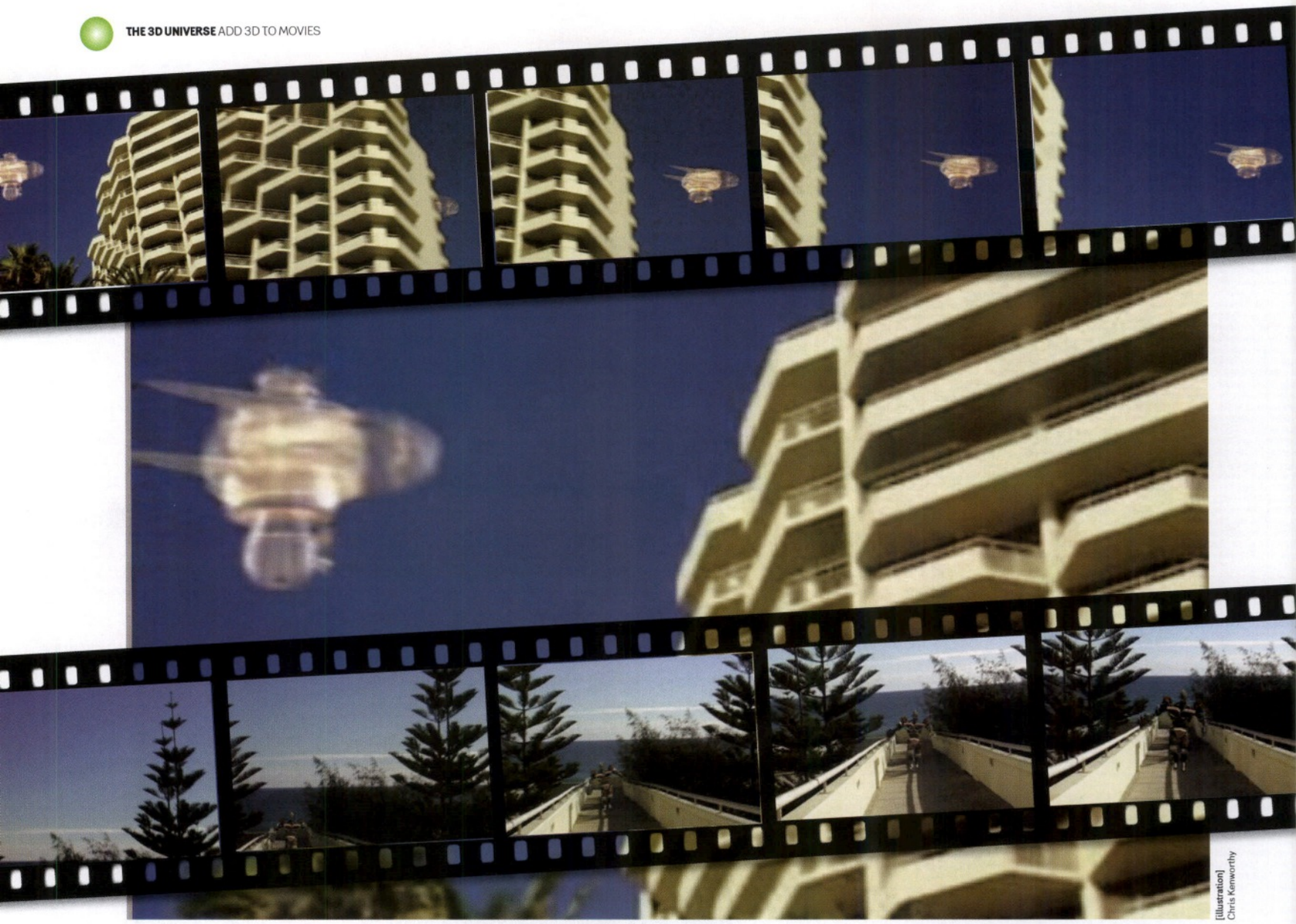
4 If at any time you need to reposition or reorientate any of the car rig's components, it's vital that you remember to update their initial state. If you miss this step, they'll simply return to their previous initial state as soon as you run the simulation. To set their new state, select all the objects, and from the Modify > Rigid Body menu, choose Set Initial State.



5 Press 8 to open the Scene Explorer, select the ground object and press H to unhide it. We don't want this object to be affected by any forces in the scene, but we do want it to be included in the simulation. From the Create > Rigid Body menu, choose Passive Rigid Body. In the PPG, change the Collision type to Actual Shape as we want the car to follow the actual shape of the ground.



6 The last thing we need to do is add an actual force to the scene, so from the Get > Force menu, choose Gravity and you're done. To get a more accurate result, click the Explore button in the Select panel and choose Environments. Expand the tree Environment > Operators and pick the Dynamics Operator. In the PPG, change the Sub steps under Simulation Accuracy to around 10. Now unhide the high resolution version of the car body and the wheel (of which you'll obviously need another three duplicates), and use a standard Constrain > Pose to constrain them to their respective counterpart in the RBD rig. Note that you should use cnscomp (constraint compensation) for the body, due to the scaling of the chassis. Your toy car is now rigged, and ready for animation. ■



[Illustration] Chris Kenworthy

Add 3D to movies

All the resources needed to follow this tutorial can be found on the CD, in the Tutorial files\ Add 3D to movies folder

How do you blend moving 3D footage with 2D handheld video? In Hollywood, they take data from the camera's on-set motion and feed that into the computer. Thankfully, there's a low-budget alternative

Blending computer-generated images with handheld video to create one striking shot requires careful use of a technique known as matchmoving – basically, synchronising the movements of your real-world camera with that of your virtual camera and its computer-generated subject matter. You can replicate this effect well using Adobe *After Effects*.

After Effects' motion-tracking facilities enable you to easily attach computer-generated elements to background footage, add a logo to a moving vehicle, or attach a CG city to the horizon. But it all gets trickier when you want your CG images to move through the environment at the same speed as the moving camera.

In this tutorial we'll show you how to incorporate a flying 3D spaceship into a handheld video environment, and then get a 3D robot to walk up a pathway within the footage. If the camera were static, this would be simple, but because the camera moves throughout the shot you'll need to combine several techniques.

Normally, when tracking motion, you change only the position of a layer. This locks your layer to the background environment. But if your subject is meant to be moving against that background, locking a layer in place doesn't help. The solution is to lock the layers, and then animate the anchor point of your 3D elements. This requires a lot of skill and fine judgment (as well as artistic flair), but the results can be spectacular.

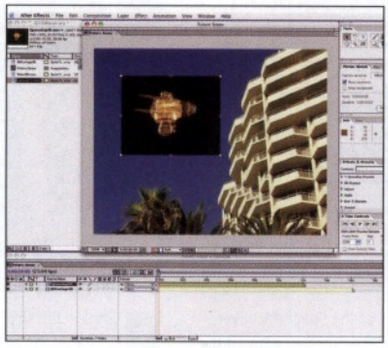
So the aim of this tutorial is to create a convincing impression of reality, with the minimum of time and effort. The shadows you create won't be completely realistic, but so long as they convince the viewer that the robot is walking on the ground, that's all that matters. Once mastered, these techniques can easily be adapted to work for your own 3D models and video footage.

Motion tracking

Start by animating the spaceship so it disappears behind the hotel...

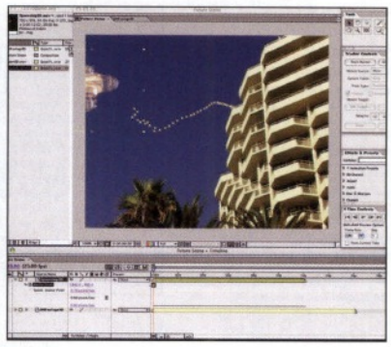
Scaling shapes

Scale changes can help to exaggerate 3D movement. Go to the start of the clip, click the layer and drag the upper frame-line to stretch the layer vertically. Keyframe the scale, move forward to the point where the ship disappears, and drag the frame line to squash the ship. This exaggerates the swooping movement, and is ideal for clips where the computer-generated element is a static frame, or has very little motion.

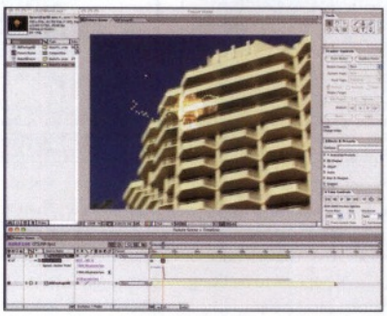


1 First, watch Future.mp4 to see what you're trying to achieve. Then open *After Effects* (6.5 has better tracing capabilities) and choose Create a New Composition. Import BGFootage and Spaceship 3D from the CD, and drag them to the timeline. Now select the Ship layer, press S, and resize the image by dragging it on to the scale numbers. Go to Layer > Blending Mode > Add.

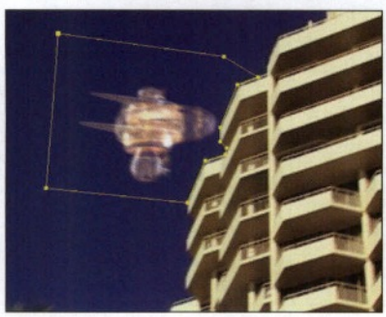
2 Select the BGFootage layer. Go to Window > Tracker Controls and click Track Motion. Check the Position Box and drag the target to a sharp edge on the building. Click Options and Choose Process Before Match (Enhance), Luminance, and Track fields. Click OK, then Track Forward.



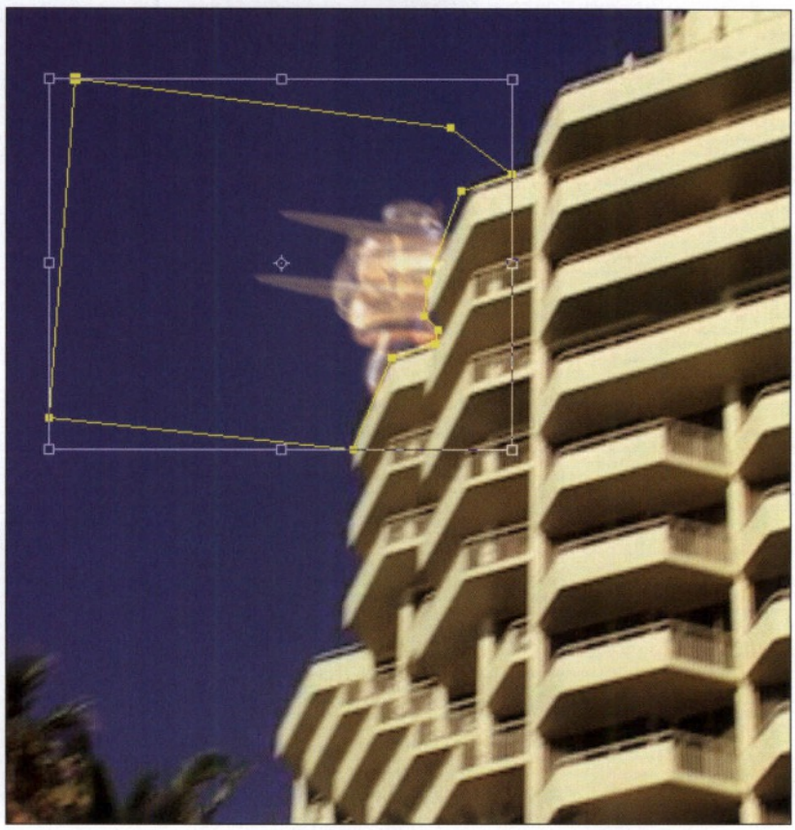
3 Click Apply, then click the Comp Window tab at the top-left of the Viewer to see the result. Select the Ship layer, press A and drag the Anchor arrows until the ship is positioned just off the screen at the top-left. Click the Keyframe Clock to lock it in place.



4 Go to the one-second point in the timeline, and again drag over the Anchor position numbers until the ship is behind the building. At this point it's still visible; you need to draw a mask so it vanishes as it touches the edge.



5 Where the ship almost touches the building, check the Motion Blur box and make the Blur visible by clicking the M just above. Use the Pen Tool to draw a mask around the ship, lining it up as shown.



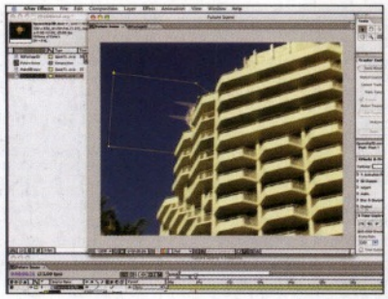
6 Hit M to reveal the Mask Shape settings before clicking the Keyframe Clock. Move forward a few frames, and use the Pointer to drag the mask so that it again covers the building edge. Repeat until the mask is ready.

Motion tracking, continued

Make the spaceship fly into the distance, and start tracking the robot...

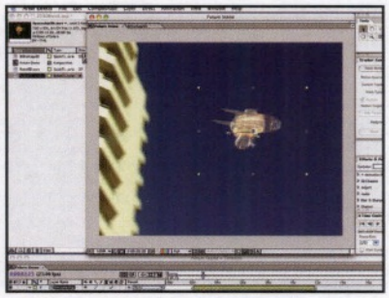
Tracking points

Motion tracking is powerful, but requires some skill because good tracking points are essential if you're to produce accurate results. The most easily tracked points are sharp edges or distinctive spots. Don't position the Tracker on the edge of a wall, or it will slide up and down the edge. Instead, pick the corner where two wall edges meet. If you're having difficulty, drag the Tracker box wider, but be prepared for a longer wait while the images are processed.



7 Click F, and drag the Feather Edges to three pixels. If the mask is well animated, the ship will look as if it's sliding behind the building. If there are gaps between ship and building, go to the worst point, and drag the mask into place to correct the animation.

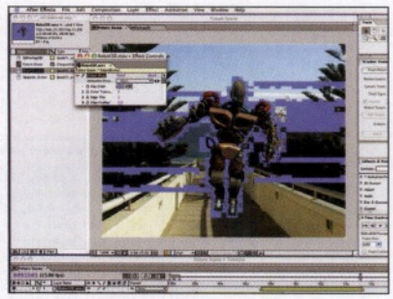
8 Drag the right edge of the Spaceship layer to shorten the clip. Drag another copy of the Spaceship clip to the timeline, hit Enter, and name it Ship 2. In the BGFootage on the cover CD, the camera pans so smoothly that you only have to 'simulate' motion tracking.



9 Position the ship 'behind' the building, Keyframe the position points, move forward a few frames and then drag the spaceship to the right. Watch through to see whether this motion matches the opening of the shot. Use the Pen Tool to create and animate a mask so that the ship appears again from behind the building.

10 As the camera moves to the right you can leave the ship in roughly the same place on screen, and it will appear to fly through the landscape. To add realism, change the position slightly every second or so to add a realistic wobble.

11 To make the ship 'warp' away, go to the seven-second point and Keyframe the scale setting at 100%. Move a couple of seconds forward and reduce the scale to 0. You can also drag the ship to the right, so it appears to be flying away, rather than just shrinking to a point.



12 Drag the Robot3D clip from the cover CD to the timeline. Then go to Effect > Keying > ColorKey, and use the eyedropper to key out the blue. Adjust Tolerance and Edge feathering to create a good matte. Apply the Spill Suppressor filter and the Matt Choker with Gray Level set to 30%. Check Motion Blur on for this layer.

13 Go to the end of the timeline, select the BGfootage layer and use your Track Motion skills to track an appropriate point in this scene. Use the Track Backwards arrow, because the most accurate tracking information occurs at this end of the clip, and becomes increasingly less accurate as the walkway disappears.

14 Apply the Track to the Robot layer. Go to the point where the walkway appears, and drag the Robot's Scale down until he appears to be in the distance. Delete about ten position points around the time where he appears, and place him manually so that he comes into shot as the camera pans down to his imposing figure.

Motion tracking, continued

Fine-tune the robot's gait and shadow and add some finishing touches to the scene...

Creating good 3D

These techniques enable you to take any 3D image or footage and apply it to moving video. It does help, however, if you know your shot before you use 3D. For this example, the video footage was shot first and then I built a ship that turned gently to the left because this would match the footage well. Because the walkway was positioned directly in front of the camera, the robot was animated to walk straight towards it.

15 You'll notice that although tracked into position, the robot doesn't appear to move forwards as fast as he should; he's almost moonwalking. By changing the anchor points at the beginning and the end of his clip, you can make his steps appear more realistic. Experiment with this until you get the look you're after.

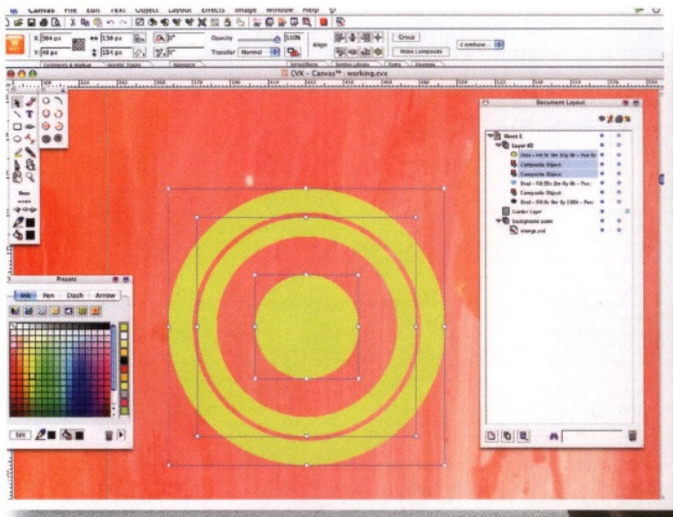
16 Use the Edit menu to copy and paste the Robot layer and rename it Shadow. Choose Apple Effects > Brightness and Contrast, and set both to -100. Press T, and reduce the opacity to 35 to create a realistic shadow. Drag the edges of the frame to squash it down and improve its look.

17 Add a Gaussian Blur to the shadow, with a blur setting of 3. In the timeline, drag the shadow beneath the Robot layer. Adjust the Anchor point each time to ensure that the shadows and feet meet realistically.

18 Use the Rectangular Mask Tool to drag a Mask box from the midpoint of the shadow. Press F, and feather the edges by 20 pixels. This makes the shadow blend in with the shadow from the wall more effectively.

19 If you have *After Effects 6.5*, add a neat touch by applying the Light Rays filter to the Spaceship layer. Keyframe the intensity to 0, then drag it to 100 as the ship warps, and back down again as it vanishes. Keyframe the Center over the ship throughout the clip.

20 Make sure Motion Blur is on for all layers and then Render the finished product. You've now successfully matchmoved computer-generated elements with some difficult background footage. ■



ON YOUR CD

5

Disc pages

You're unlikely to own all of the software featured in this book, and on your CD you'll find links to manufacturers' websites where you'll find more information on the applications, and be able to download trial versions. On the following pages you'll find bonus tutorials that will help you to get more out of Adobe's *Photoshop* and *Illustrator*, and ACD Systems' *Canvas*.

215	Hybrid illustration with *Canvas*
219	Organic imagery with *Photoshop* and *Illustrator*
222	Work smart with symbols in *Illustrator*

ON YOUR CD

[illustration] Derek Lea [w] www.dereklea.com

Hybrid illustration

All components needed to complete this tutorial can be found on the cover disc, in the Tutorial files/Hybrid illustration folder.

By combining familiar vector drawing tools with image-editing functions, you can create stunning hybrid images within a single program. **Derek Lea** shows you how to get the most from *Canvas'* versatile toolset

Canvas is a unique application that fuses together different tools and functions, often separated into two or more distinctly different programs. Users of any of the major vector drawing applications or image-editing programs will find a set of familiar tools and functions.

It takes a bit of poking around to find all of the tools, but after a brief investment of time you'll find almost everything you need to begin working in a similar manner as you would with, say, *Illustrator* or *Photoshop*.

The major advantage of *Canvas* is integration. With this one application you can create stunning illustrations that would normally require you to bounce your files between different pieces of software.

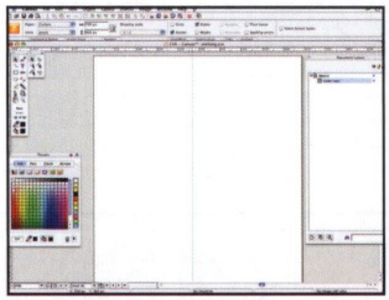
One thing that will leave Adobe veterans scratching their heads is the absence of a Layers palette, but all of the traditional features reside within *Canvas'* Document Layout palette. You'll find the same sort of thing with functions such as object Boolean operations. In *Photoshop* you have a set of Add, Subtract, and Intersect buttons in the tool options bar. In *Canvas*, you'll find similar operations hidden away in the Properties bar.

The alignment features appear within the Properties bar, too, in contrast to *Illustrator*, where the Alignment buttons are contained in their own palette. Functions such as dragging layers within the palette work in the much the same way as Alt/Option-dragging objects to copy them.

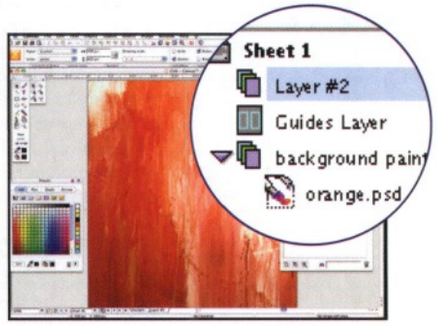
Adobe users will soon get used to *Canvas*, and newcomers may pick things up even more quickly. Either way, open up the files and try creating this illustration, which combines vectors and pixels within a single application.

Get started with Canvas

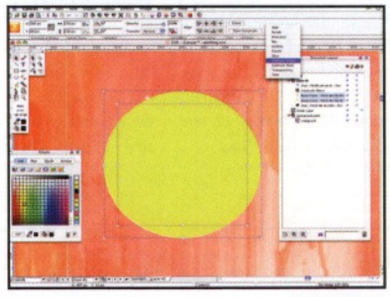
Create a new file and start building up your image



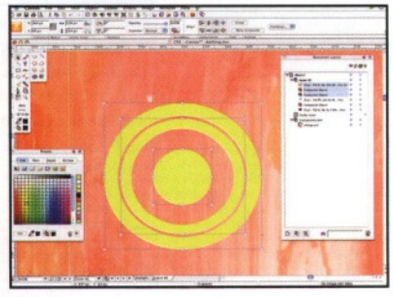
1 Launch *Canvas*, and create a new file via the File > New menu command. Create an illustration document that's 250mm wide and 290mm high. Make the rulers visible via the Layout > Display options in the menu. Drag a horizontal guide from the left ruler to the middle of the canvas to create a guides layer on the document.



2 Create a new layer in the Document Layout palette, and drag it beneath the guides layer. Select Image > Import to import the orange.psd image file from the CD. Load it as a merged result when prompted, and drag it into position to cover the canvas. Create another new layer in the Document Layout palette.



3 Select the Oval tool, and Shift-drag a number of times to create a series of circles on the new layer. Use the Selection tool to select one circle, and then Shift-click on another to select that one as well. Press the Align Centre button in the Properties bar, and then choose the Subtract Front option from the Combine menu.



4 Use this method to create a number of different composite objects. You can even select two composite shapes and align them. Shapes can be aligned together using the same methods, and grouped together via the Group button in the Properties bar.

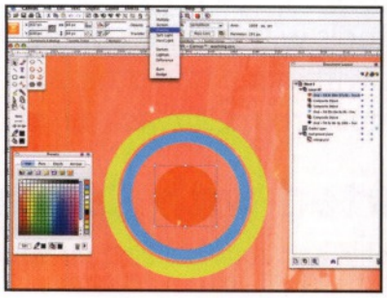
ON YOUR CD

Getting started with Canvas, continued

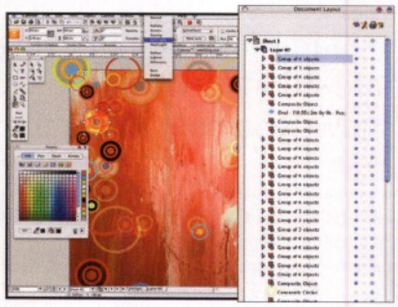
Draw and combine shapes to create a simple character

Layers and object features

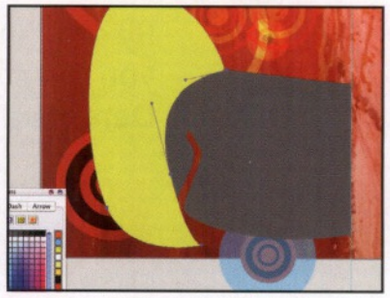
Double-click on any layer or in the Document Layout palette to open a dialog box. In this box you can name your layer, as well as control properties such as visibility and the ability to print or lock the object. Double-clicking an object reveals a dialog box with controls enabling you to alter the object's dimension or position, or to edit the trapping settings. New objects are added to whichever layer is currently targeted within the palette.



5 Use the Opacity slider and the Transfer options in the Properties bar to vary how selected objects blend with underlying shapes and layers. Edit a selected shape's fill colour by choosing a colour from the Ink section of the Presets palette. Specify whether your colour affects a stroke or fill by choosing the appropriate button at the bottom of the palette.



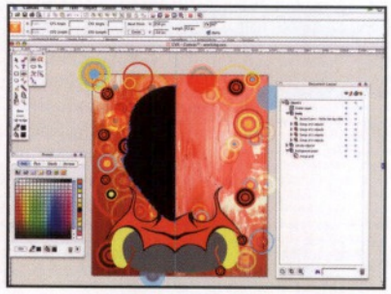
6 Stroke width is controlled in the Pen section of the Presets palette. Add a stroke to objects as you see fit. Use these methods to create numerous diverse circular shapes on this layer. Have some fun with Transfer and Opacity settings. You can move shapes up and down within the layer in the Document Layout palette.



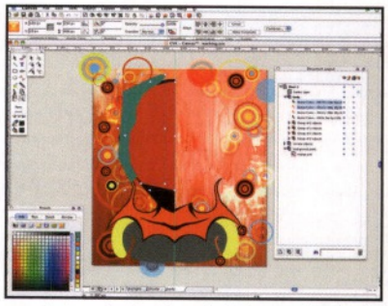
7 Create a new layer, and select the Curve tool. Draw a grey closed shape to create half of the character's chest and choose Edit > Replicate. Don't offset or scale the shape, and make a copy in the Replicate dialog box. Draw a yellow shape that overlaps the replicated object.

8 Select the yellow shape and the replicated shape, then choose the Intersect option from the Combine menu in the Properties bar. Select the grey shape and the intersected shape, and Group them in the Properties bar. Hold down Alt/Option+Shift, and drag the group to the right to copy them. Now choose Effects > Flip > Horizontal from the menu.

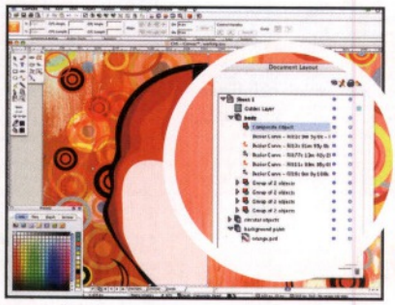
9 If necessary, drag the groups together so that they meet at the guide in the middle. Now use the Curve tool to draw a black shape for half of the character's cape. Next draw a red shape on top of it, slightly smaller, with a few areas where black will show through, like linework.



10 Select both shapes and group them. Use the method you used previously to drag a copy of the group to the right and flip it. You should ensure that these two groups meet at the guide in the centre. Now use the Curve tool to draw a black shape to define half of the head.



11 Again using the Curve tool, draw a closed red object to represent the left half of the hood. Replicate this object as you've done previously with other objects via the Edit menu. Now draw a blue shape to indicate the shadow along the left-hand side, overlapping the hood. Select this shape as well as the replicated object.

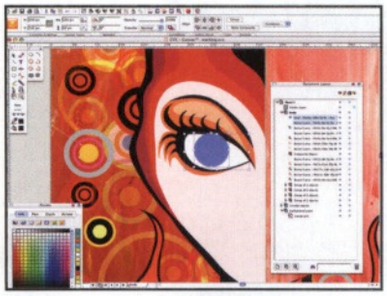


12 Select the Intersect option from the Combine menu in the Properties bar, and then reduce the Object Opacity to 21%. Select a lighter red colour, and then create a closed shape to indicate a painted devil's horn on the hood. Use the Curve tool to draw half of the character's face, and the black detail on her hood.

13 Use the Curve tool to draw two orange areas that will define the region around her eye. Make the area between the eyelid and eyebrow a little lighter, then carefully draw the black outline of the eye, complete with lashes. When you're finished, draw another black object to define the eyebrow.

Scaling objects

When you click on an object with the Selection tool a bounding box will appear around it. You can click and drag on a corner or mid-point to adjust the size and shape – this is a very similar process to using the Free Transform bounding box in *Photoshop*. Also as in *Photoshop* you can hold down the Shift key while dragging a corner point to adjust the scale of the object while preserving the horizontal-to-vertical aspect ratio.



14 With the Curve tool, draw a white object to define the white area of the eye, and replicate it as with the other shapes. Next select the Oval tool, hold down the Shift key and draw a blue circle. Position it where the iris would be, then select it and select the replicated white object.

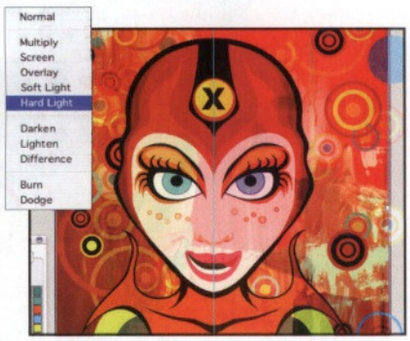
15 Choose the Intersect option from the Combine menu, and replicate the resulting composite object. Now create a lighter blue circle over the top of the replicated object and select them both. Once again, choose the Intersect option from the Combine menu, and draw a final black oval in the centre of the resulting object to represent the eye's pupil.

16 By now you're probably getting the hang of the Curve tool and the Combine menu. Use these tools to create a series of closed objects on this half of the character's face to indicate her lips, mouth, teeth, the shape of her nose, and the nostrils. Next choose the Select tool.

17 Select all of the objects within this layer and group them together. Press Alt/Option+Shift and drag the group to the right to copy it, then flip the whole thing horizontally. Click the Ungroup button in the Properties bar. Use the Curve tool to draw a pink tongue, and drag it below the lips object in the Document Layout palette.

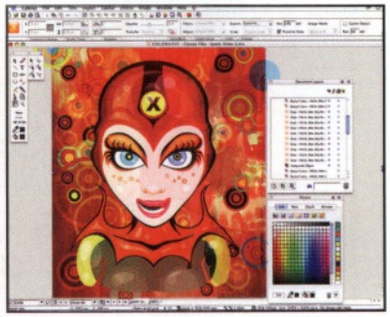
18 Use the Oval tool to draw a couple of offset circles in the centre of the hood, then draw a series of freckles across the cheeks. Use the Pen section of the Presets palette to vary the thickness of the strokes, and the Ink section to vary the colour. Alter the opacity of individual freckles in the Properties bar.

19 Select the Text tool, click in the yellow circle area and type an 'x'. Within the Properties bar, select a very bold sans serif font and a generous size. Then, in the Presets palette, specify a black ink fill and red stroke. Choose Image > Import from the menu, and locate the multi.psd file on the CD.



20 Load the image as a merged result and, using the Selection tool, position it over the canvas area. Change the transfer method to Overlay, then flip the image vertically via the option in the Effect menu. Replicate the image, then change the transfer function of the replicate to Hard Light. Reduce the opacity to 36%.

21 Drag the replicated image down in the Document Layout palette until it resides beneath the objects that define the skin of the face. Disable the visibility of the guides layer, and use the Selection tool and the arrow keys to nudge together any objects that don't meet in the centre.



22 Create a new layer, and set about creating highlight areas on the character's face and clothing. Use both the Curve and Oval tools to create a variety of different and overlapping white shapes. Finally, reduce the opacity of the shapes, and then add some yellow circles and composite circles over the pupils.

ON YOUR CD

[illustration] Nigel Dennis [w] www.electricheat.com

Organic imagery

All components needed to complete this tutorial can be found on the cover disc, in the Tutorial files/Organic imagery folder.

There's no easy way to create an organic, atmospheric palette in *Photoshop*. It takes plenty of manual work combined with a knowledge of colour and digital blending. **Nigel Dennis** shows you how

The main aim of this tutorial is to guide you through the techniques needed to create an organic feel within your illustrations. Many people try to find an easy way to create images like the one featured here, but to create a genuine colour palette, you'll need to put in some time and effort. Try creating watercolour washes manually, scanning them in, collecting images, collecting clip-art (cheesy or not), and acquiring a good in-depth knowledge of colour blending and layer blending modes in Photoshop and Illustrator.

This tutorial will help you take your illustrations to a new organic level. How far you take things is up to you. Everyone has a style they choose to work in, but blending the organic with the digital is something that requires an understanding of your programs and an in-depth appreciation of colour.

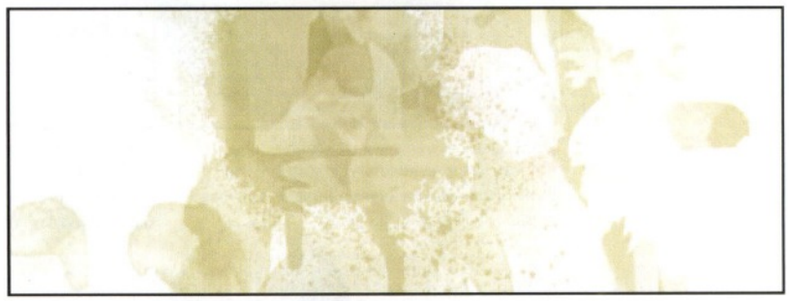
Every illustration has an end goal, and every artist has an idea and vision for what their piece should look like. Taking a basic knowledge of traditional fine art and an understanding of digital art and illustration you'll start to get the look, feel and aesthetic that you want.

Whether or not you're talented with a paintbrush, the techniques and approaches outlined here will benefit you. Take these tips on board and you'll create not only a definitive style, but a pool of resources, too – organic elements that can be used over and over to create unique images.

An organic illustration

Create watercolour washes, and scan them into *Photoshop*

1 Create a random watercolour wash in a medium of your choice that will give you a selection of textures to choose from. The key to a great composition is knowing where to place your resources, so don't use all of the washes you create, but select only the best.



2 Scan your washes into *Photoshop*, and place the copied watercolour layers behind your main illustration layer. Adjust the blending modes as necessary (in this case, Multiply is the best) and alter the Hue/Saturation until you're happy with the effect. Use layer masks to blend areas of colour if needed.

3 Choose an image for your main focal point: a photographic portrait is ideal. Using the Pen Tool, create a selection around the desired area of your photo, and copy and paste this into your illustration. Add a mask to the layer, and then position it and blend in where necessary.

4 Now you can start to bring each of these separate elements forward using layers of colour that are set to different blending modes. Spend some time experimenting with the blending modes until you achieve a display of colour you're happy with.

ON YOUR CD

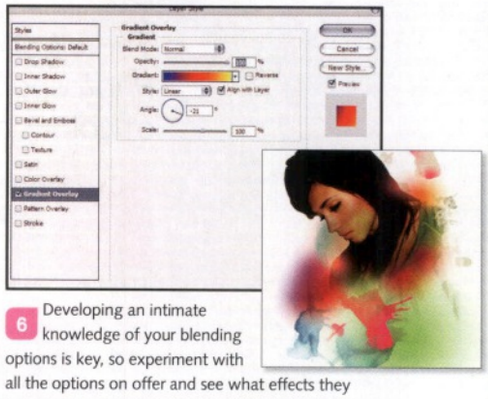
An organic illustration, continued

Build up your composition by blending different colours and elements

Brush and blur

You can create more depth when airbrushing by distorting and then blurring your strokes. Try applying the Filter > Distort > Ripple effect to give your strokes some texture, then select Filter > Blur > Radial Blur, and set Amount to 50 and Method to Zoom for a more subtle watery effect.

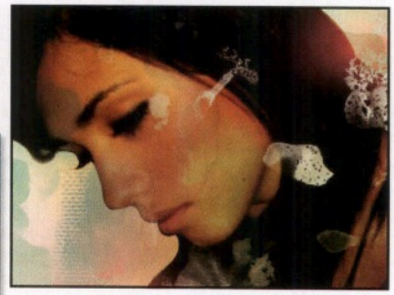
5 Continue building up your composition, adding new elements, colours and layers, and then edit the blending options further still until you create a smooth blend of colour.



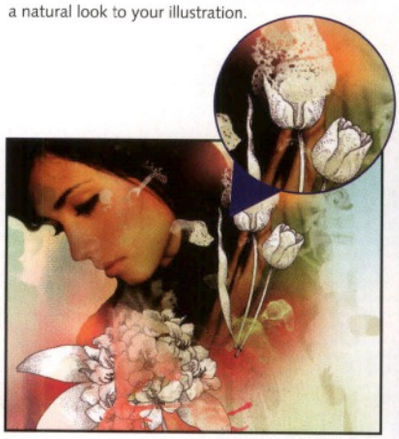
6 Developing an intimate knowledge of your blending options is key, so experiment with all the options on offer and see what effects they create. You might discover something really unusual. Pick the best blending options for this piece, and work them into your image.

7 Sometimes using a light airbrush setting can create an atmospheric wash of colour. Blending this with the organic elements can bring a natural look to your illustration.

8 Continue to use the airbrush to build up layers of colour, and blend them using the Gradient Overlay layer style.



9 Continue layering your organic watercolour washes until you build up an effective sense of depth. The use of organic elements is the key to successfully achieving this aesthetic.



10 Place images, photos or clipart of your choice around the watercolour to create a blended feel. The additions should sit comfortably within the image you have created. If you want to retain the white fill, ensure all outside paths are closed.

11 Continue to build up new elements – ink splotches always work very well. At this stage you could also leave *Photoshop*, open *Illustrator* and create a range of vector scribbles. Import these into *Photoshop*, and add them to your composition.

12 Creating perspective and depth in a flat space can give your work a new aesthetic. Although everything in this image is two-dimensional, a real sense of depth can be achieved by creating layer masks and then hiding and revealing different layers.

Layer Comps

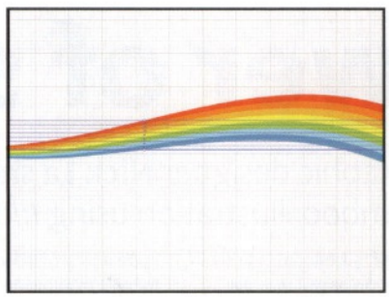
Because your image will be composed of so many layers, if you have *Photoshop CS* or *CS2* you should get into the habit of using the Layer Comps function to record the state of the Layers palette. This will also enable you to compare different variations of opacity settings and blending modes without having to remember dozens of complicated settings.

13 Vector silhouettes, created in *Photoshop* or *Illustrator*, are always easy on the eye. It's really simple to create silhouettes from photos without having to mess around with importing photographs into *Illustrator* to trace or auto-trace.

14 Choose an image you like and select Image > Adjust > Threshold. Move the slider until you're happy with the effect and then hit OK. Select the Magic Wand Tool, disable the Contiguous option and Anti-aliasing, and select only a part of the image that is black. Then simply copy your selection, and paste it into the illustration.

15 Open up vector silhouettes of any images you like, copy the silhouette illustrations from *Illustrator* and place them in Photoshop. Adjust their size, and then choose Place from the menu.

16 Creating linear colour combinations, such as this rainbow, in *Illustrator* can create a successful flow and accent of colour. Create any amount of colour boxes, group them together, and then select the lines. Choose Effect > Warp, and enter any settings you like.



17 The next step is to copy and paste this element into *Photoshop*. Choose your colour lines in *Illustrator*, choose Copy, open your Photoshop window and then select Edit > Paste > As Pixels. Resize the image, and then place it as required.

18 Using existing resources, or new elements created in *Photoshop* or *Illustrator*, develop more and more layers of elements and details as required. Plenty of clipart and hand strokes of ink will always make your compositions look great.

19 Add in a range of smaller elements where necessary to give your piece a feeling of scale. If you want to save time, try copying details from other images and placing them strategically throughout your illustration.

20 Take screen grabs to capture elements of your software's interface. From these you'll be able to create geometric elements such as a grid in *Illustrator* or *Photoshop*, which, when added to your illustration, will create a striking juxtaposition between the digital and the organic.

ON YOUR CD

[illustration] Nick La [w] www.ndesign-studio.com

The power of symbols

Web and graphic designer **Nick La** shows you how to create this striking Chinese bamboo illustration using *Illustrator's* versatile symbol tools

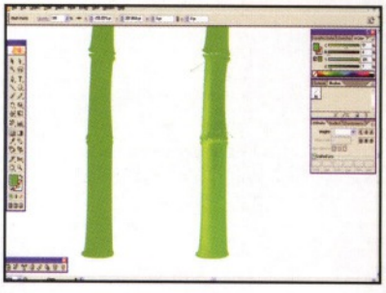
The goal of this tutorial is to show you just how easy it is to use *Illustrator's* Symbol tools to create a realistic Chinese bamboo illustration. It is fun and easy. All you need is just one symbol, from which you can create a group of symbol instances in no time at all using *Illustrator's* Symbol Sprayer Tool. The appearance of these symbol instances can then be manipulated using various Symbol tools. You can change the transparency, size, colour, location, rotation and style of each individual instance within the group. You can increase or decrease the size of an instance using the Symbol Sizer Tool, or change its Opacity with the Symbol Screener Tool. You can also colour the instances, apply graphic styles, and much more.

You'll be amazed how easy it is to create a complicated illustration with a minimum of fuss. From here, you could transform your image by creating a group of flying butterflies or falling leaves, or use the same techniques to create a realistic grass field.

Instant illustration

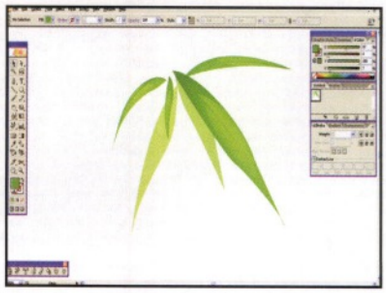
Create simple shapes, and use the Symbol tools to duplicate and manipulate them

You'll find the completed image on the cover disc, in the Tutorial files/Organic imagery folder.



1 It's best to start this simple illustration by creating a range of basic bamboo shapes. In *Illustrator*, create a shape, and use the Mesh Tool to create the highlight and shadow of the bamboo stalks. Repeat this step until all the stalks are completed, then group them together.

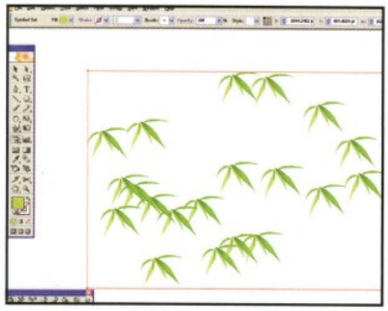
2 Quickly create more bamboo by holding down Alt/Option and clicking and dragging the group to duplicate it, or copy and paste. Resize each bamboo stalk individually so they don't look identical. Try resizing them using the Selection Tool, or use the Twist Tool to bend them a bit.



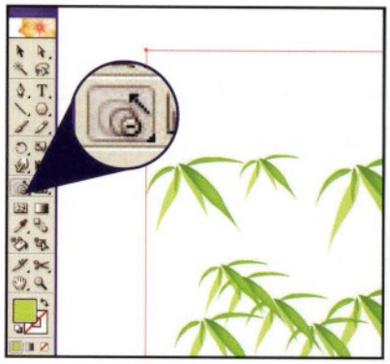
3 Create some bamboo leaves using the Pen and Mesh tools, using different colours and opacities for each piece to achieve a natural effect. Drag it to the Symbols palette to make a new symbol. Once the symbol has been created, and you're happy with it, you can delete these objects if you wish.

Tool options

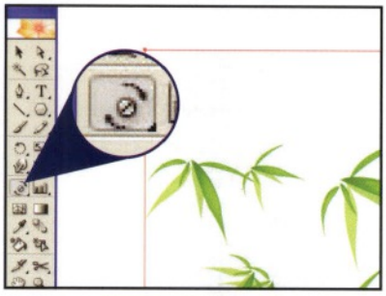
You can change the options for any Symbol tool by selecting it in the toolbox and then double-clicking to open a dialog box. You can change settings such as Diameter, Intensity and Density – adjust the Diameter setting to specify the tool's brush size.



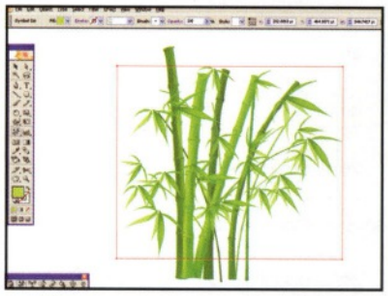
4 Create a new layer, and immediately hide Layer 1. Select the leaves symbol you created in step 3, and use the Symbol Sprayer Tool to drag it on to the screen. This will create a group of the symbol instances. If you want to delete any of these instances, hold down Alt/Option and click on them.



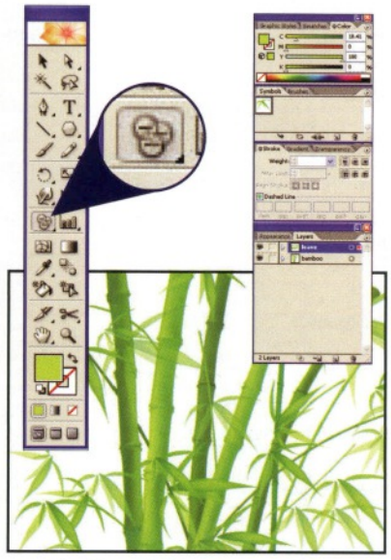
5 Use the Symbol Sizer to selectively increase the size of some instances. Holding down Alt/Option and clicking with the tool will reduce the size of each instance.



6 Use the Symbol Spinner Tool to rotate the instances within the group. With the symbol instance object selected, drag the instances (leaves) and you'll see that you can now rotate them in any direction you wish.



7 Now you can turn on Layer 1. Use the Symbol Shifter Tool to shift the instances around. Try to position the instances around so that they attach themselves to the bamboo sticks you created earlier.



8 Select the Symbol Screener Tool, and randomly click on the instances. You'll see that the opacity of the selected instances has started to reduce. This will give some of your leaves a slightly see-through effect.

9 Choose a yellowish colour, select the Symbol Stainer and click on some of the instances to create a dead leaf effect. Try staining the leaves with different tones of green, so that each leaf looks slightly different.

10 Finally, create a new layer and add more bamboo leaves using the same techniques. Once you've finished, export your illustration to *Photoshop*, where you can add lighting effects, as shown in the sample image on the CD. ■

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